# DOCUMENT RESUME

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ABSTRACT

The following papers are included in this proceedings of a conference on agricultural education: "Misuse of Statistics" (Miller); "Significance of Doctoral Research in Agricultural Education" (Moore, Bailey, Burnett); "Identification of Science-Related Competencies Taught in Vocational Agriculture Programs in Louisiana" (Moss); "Attitudes Held by Vocational Agriculture Teachers toward FFA [Future Farmers of America] Proficiency Awards" (Kotrlik); "College Administrators' Image of the Agriculture Teacher Education Programs: A National Study" (Crunkilton, Miller, Lee, Dlamini); "Perceptions of School Administrators toward Vocational Agricultural Programs" (Jewell); "Quality Indicators Used in Hiring: A Comparison of Deans of Education and Chief Administrators of Agricultural Education Departments" (Deeds and Moore); "Determination of the Need for Extension Horticultural Education Programs for Garden Center Employees" (Bradshaw, Arrington); "Instructional Management in Agricultural Mechanics: The Effects of Concentrated Mental Practice on Oxy-Fuel Gas Welding Skills" (Burke); "Relationship between Selected Teacher Presage Variables and SOE [Supervised Occupational Experience] Quality" (Makin, Miller); "Professional Role Perceptions Held by Two Groups of Vocational Agriculture Teachers in Michigan" (Powers); "Perceptions of Former State FFA Officers in the Southern Region of the United States toward the Profession of Teaching Vocational Agriculture" (Price, Jewell); "Delivery of Adult Education: A Case Study" (Miller, Cano); "Agricultural Interests That Supported the Smith-Hughes Act with Implications for Today's Legislative Process" (Hillison, Herren); "Which Act Started Agricultural Education? Was It Really the Smith-Hughes Act or Was It the Hatch Act?" (Moore); "Evolution of the Problem-Solving Approach in Agricultural Education: A Historical Analysis" (Lass, Moss); "Microcomputer Use in Vocational Agriculture Programs in the United States" (Miller and Kotrlik); "Hearing Loss among Teachers of Agricultural Mechanics" (Burke); "Characteristics and Attitudes Associated with the Use of Microcomputers by North Carolina Vocational Agriculture Teachers" (Malpiedi, Blake); "Factors Affecting Job Satisfaction of North Carolina Vocational Agriculture Teachers" (Beavers, Jewell, Malpiedi); "Assessment of the Morale of Beginning Vocational Agriculture Teachers in Illinois" (Flowers, Pepple); and "Factors Related to the Career Decisions of Seniors Who Have Taken Vocational Agriculture" (Kotrlik, Harrison). (MN)

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# THIRTY SIXTH ANNUAL
# SOUTHERN REGION RESEARCH CONFERENCE
# IN AGRICULTURAL EDUCATION

## PROCEEDINGS

March 22-23, 1987

Fort Magruder Inn

Williamsburg, Virginia

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## REGISTRATION

Saturday Night 7:00 - 9:00 pm
Sunday Morning 8:15 - 8:45 am

Sunday, March 22

8:45 am - 10:am

## OPENING SESSION

Presider: Martin McMillion, Virginia Tech

Misuse of Statistics
Larry E. Miller, The Ohio State University

## Presentation of Papers

10:30 am - 12:00 noon

Presider: Carl Beeman, University of Florida

The Significance of Doctoral Research in Agricultural Education
Gary E. Moore, Louisiana State University
James Bailey, Louisiana State University
Michael F. Burnett, Louisiana State University

Identification of Science-Related Competencies Taught in Vocational Agriculture Programs in Louisiana
Dr. Jeffrey W. Moss, Louisiana State University

Attitudes Held by Vocational Agriculture Teachers Toward FFA Proficiency Awards
Dr. Joe W. Kotrlik, Louisiana State University

Discussant: J. Dale Oliver, Virginia Tech

## Concurrent Paper Sessions

## GROUP 1

1:30 pm - 3:00 pm

Presider: Herman Brown, Texas A & M University

College Administrators' Image of the Agriculture Teacher Education Programs: A National Study
Dr. John R. Crunkilton, Virginia Tech
Dr. Larry E. Miller, The Ohio State University
Dr. Jasper S. Lee, Mississippi State University
Marietta P. Dlamini, The Ohio State University

"Perceptions of School Administrators Toward Vocational Agricultural Programs
Dr. Larry R. Jewell, North Carolina State University

Quality Indicators Used in Hiring: A Comparison of Deans of Education and Chief Administrators of Agricultural Education Departments
Dr. Jacquelyn P. Deeds, Mississippi State University
Dr. Arnold J. Moore, Mississippi State University

Discussant: Jeff Moss, Louisiana State University

## GROUP 2

Presider: John A. Rolloff, University of Arkansas

Determination of the Need for Extension Horticultural Education Programs for Garden Center Employees
Joan P. Bradshaw, Largo, Florida
Dr. Larry R. Arrington, University of Florida

Instructional Management in Agricultural Mechanics: The Effects of Concentrated Mental Practice on Oxy-Fuel Gas Welding Skills
Dr. Stanley R. Burke, Virginia Tech

The Relationship Between Selected Teacher Presage Variables and SOE Quality
Dr. Richard C. Makin, The Ohio State University
Dr. Larry E. Miller, The Ohio State University

Discussant: Joe Kotrlik, Louisiana State University

3:30 pm - 5:00 pm

## GROUP 1

Presider: Maynard Iverson, University of Georgia

Professional Role Perceptions Held by Two Groups of Vocational Agriculture Teachers in Michigan
Dr. Larry Powers, North Carolina A & T State University

Perceptions of Former State FFA Officers in the Southern Region of the United States Toward the Profession of Teaching Vocational Agriculture
Dr. Larry E. Price, North Edgecombe High School
Dr. Larry R. Jewell, North Carolina State University

Delivery of Adult Education: A Case Study
Dr. Larry E. Miller, The Ohio State University
Jamie Cano, The Ohio State University

Discussant: Max McGhee, University of Florida

## GROUP 2

Presider: David Coffey, Western Kentucky

Agricultural Interests That Supported the Smith-Hughes Act with Implications for Today's Legislative Process
Dr. John Hillison, Virginia Tech
Dr. Ray Herren, Oregon State University

Which Act Started Agricultural Education? Was It Really The Smith-Hughes Act or Was It The Hatch Act?
Dr. Gary E. Moore, Louisiana State University

The Evolution of the Problem-Solving Approach in Agricultural Education: A Historical Analysis
Cynthia B. Lass, Louisiana State University
Dr. Jeffrey W. Moss, Louisiana State University

Discussant: Glen Shinn, Mississippi State University

Monday, March 23

8:30 am - 10:00 am

## GROUP 1

Presider: James Clouse, Virginia Tech

Microcomputer Use in Vocational Agriculture Programs in the United States
Mr. Charles Miller, Iota High School, Iota, Louisiana
Dr. Joe W. Kotrlik, Louisiana State University

Hearing Loss Among Teachers of Agricultural Mechanics
Dr. Stanley R. Burke, Virginia Tech

Characteristics and Attitudes Associated With The Use of Microcomputers by North Carolina Vocational Agriculture Teachers
Dr. Barbara J. Malpiedi, North Carolina State University
Mr. Robert Daniel Blake, II, North Carolina State University

Discussant: Larry Miller, The Ohio State University

## GROUP 2

Presider: Jasper Lee, Mississippi State University

Factors Affecting Job Satisfaction of North Carolina Vocational Agriculture Teachers
K. C. Beavers, III, North Carolina Department of Public Instruction
Dr. Larry R. Jewell, North Carolina State University
Dr. Barbara J. Malpiedi, North Carolina State University

Assessment of the Morale of Beginning Vocational Agriculture Teachers in Illinois
Dr. Jim Flowers, North Carolina State University
Dr. Jerry Pepple, University of Illinois

Factors Related to the Career Decisions of Seniors Who Have Taken Vocational Agriculture
Dr. Joe W. Kotrlik, Louisiana State University
Betty C. Harrison, Louisiana State University

Discussant: Lloyd Blanton, Clemson University

## BUSINESS SESSION
10:30 AM - 11:30 AM

Presider: Martin McMillion, Conference Chairman

Officers: Chairman, Martin McMillion, Virginia
Vice Chairman, Larry Arrington, Florida
Secretary, Walter Taylor, Mississippi
Past Chairman, John Rolloff, Arkansas

Sponsors: The Interstate Printers and Publisehrs, Danville, IL (Breakfast Break)
American Institute of Cooperation, Washington, DC (Printing Costs)
L.B. Citrus, Riverdale, GA (Refreshments)

# MISUSE OF STATISTICS

Larry E. Miller, Professor
Department of Agricultural Education
The Ohio State University

Paper presented at the Thirty-sixth Annual
Research Conference in Agricultural Education
for the Southern Region
Williamsburg, Virginia
March 22-23, 1987

This presentation will be as much a presentation of fundamentals as highlighting the errors in analysis. So, if you are apprehensive about my selecting an article or paper you have presented and proceeding to pick it apart, please rest assured that that will not occur.

You need to know, first of all, that I do not purport to be a scholar of statistics. I continue to study and learn because I believe that "if you are green you are growing, but if you are ripe you are ready to rot". In short, the last time I have spent numerous hours reading in statistics has been considerably more recent than when I completed my doctorate at Purdue in 1972. I do this because I believe I should, because I have taught statistics at the university level, because I believe the graduate students I advise and counsel deserve some assistance, and because I believe we should not place the decision making for our analysis in the hands of statistical consultants and computer analysis assistants.

We purport to be researchers. Statistics are the tools of the researcher and we need to know our tools. Tractor mechanics, artists, and masons have their tools and they must know how to use them. We, likewise, need to know how to use ours. I challenge you to get "checked-out" again on your tools; that is, devote some of your personal inservice time to renewing, maintaining, and improving your skills. Are you "green and growing"?

I would purport to have a pretty good understanding of how to apply statistics. I could not provide derivations of formulas any more, and, frankly, do not want to do so. I think I understand where and when these tools -- statistics-- should be used. In case something I present is contrary to your thinking, let me reiterate a statement I often heard Al Krebs make: "You don't have to agree with everything I say, but you should understand it."

One can easily find a lot of contradictions in the statistical literature. Does the violation of "Assumption XYZ" destroy the power of a test? Some say "yes" and some say "no". So, there are not necessarily "pat answers". What I will attempt to present is what makes sense to me. If I have had any comparative advantage as a professional, perhaps it has been the ability to reduce the abstract to the understandable. In short, most of all, I would profess to be a teacher; one who can illustrate, explain, and show application. Therefore, any success or reputation I enjoy in this area is probably due more to pedagogical and humanistic considerations than statistical competence.

As I deal with the misuse of statistics, given the preceding, I will deal as often with the absence of analysis as with the misuse. Absence constitutes, or precipitates in many cases, the misuse, or at least the lack of clarity in describing findings, expressing results, or meeting assumptions.

Statistics, to me, are tools and I conceptualize them fitting into three tool boxes. The first box is labeled "Descriptive", the second is labeled "Correlation/Regression" and the third box is labeled "Inferential". Box #1 is filled with measures of central tendency (mean, median, and modes), dispersion (variance, standard deviation, range, average deviation, semi-interquartile range, etc.), and visual tools such as symmetry, graphs, scatterplots, polygons, charts, etc.

Box #2 has two compartments: (A) correlation and (B) regression. The correlation compartment has a variety of tools such as the Pearson, Spearman, Kendall, point biserial, tetrachloric, eta, etc., and each has a specific usage. The regression compartment has tools like heirarchial, stepwise, moderated, etc.

Box #3 also has two compartments: (A) parametric and (B) nonparametric. The parametric compartment has tools such as t-tests, F-tests, ANoVa, etc. The nonparametric compartment contains tools such as Chi Square, sign test, Wilcoxon, Mann-Whitney, Kruskal-Wallis, log linear analysis, etc.

These tools, coincidentally, correspond with the purposes of research (Figure 1). The purpose of a study and its objectives drive the selection of a statistical tool, not vice versa. Then, level of measurement, number of groups, and research design (Figure 2) help the researcher select the appropriate tool. Please understand that many tools are parallel and your favorite might not be listed, but just be sure it is appropriate if you use it, i.e., does it meet the assumptions? Do not rely just on a statistical consultant or a computer programmer to make the right decisions for you. After all, you will be the person who ultimately has to make sense out of the results of the analysis.

Most of us are relatively familiar with measures of central tendency and dispersion. While some of us have studied and/or used statistics in varying depths, most have studied and adequately understand these tools. Figure 3 provides a brief refresher of when to use what. The misuse most often encountered in this tool box results from a failure to consider the scale of measurement of the data upon which the tool is to be used.

A mean calculated on social security numbers would make little sense, nor would a mean generated from coding "men" as a one (1) and "women" as a two (2) for analysis purposes; what would a 1.4 be? A mean calculated on ordinal data would similarly be nonsensical.

My greatest concern is that we could do a lot more to describe our data with graphs and other visuals to help the readers/consumers conceptualize and understand our results. Pie charts, bar graphs, polygons, etc., often provide clarity and assist the communication. I predict, though, that an upsurgence will soon occur because of the capabilities provided by certain software programs available for microcomputers which will make the preparation of such visuals less laborious. I believe this will be a positive step for advancing the clarity of our dissemination and interpretation efforts.

## CORRELATION/REGRESSION: TOOL BOX #2

Some might prefer that I place these tools in Box #1, particularly the correlations, and others might like to see the regression placed in the inferential box; but, conceptually, it makes sense to me to keep them stored separately. Then, they are handy when I want to analyze data to explain/predict. These tools are principally used with correlational and ex post facto (relational) research.

One could also argue that each of the compartments in the box have descriptive and inferential components, and be right. For in the correlational compartment there is the descriptive statistics component of the correlation coefficients themselves and the inferential component would be to test the null hypothesis that Rho is equal to zero. In the regression compartment, the descriptive components would be beta and R squared, while the inferential components would be to test the null hypothesis that Beta is equal to zero, or that R squared is equal to zero.

### CORRELATION

Figures 4 and 5 present a system for determining which tools to use, based upon the scale of measurement for each variable (characteristic) studied. Were space available in these figures, numerous other tools could be listed.

The most common analysis is probably conducted with the Pearson product moment correlation coefficient (r). But, sometimes we run everything through r whether or not it is appropriate. The Pearson is appropriate when both variables are interval. There are two assumptions with the r which are most often violated and lead to the misuse of the tool. Remember when your statistics professor told you that the first thing to do was to construct a scatterplot? The reason for this was to assure that you had met the assumptions for r of (1) linearity and (2) homoscedasticity (See Figure 6). If the scatterplot is not linear (but curvilinear) and not homoscedastic (but heteroscedastic), then the r is not the appropriate tool to use.

If the scatterplot is curvilinear, one would use Eta, a measure of curvilinear association/relationship. You may wish to note that when running CROSSTABS on SPSS an Eta can be calculated and reported on your printout. If Eta is of similar magnitude to r, then linearity can probably be assumed. However, if Eta is high and r is low, then run a scatterplot because you probably have a curvilinear distribution.

Heteroscedastic distributions are also problematic. If you do not construct a scatterplot, about all you can do is "eyeball" the data to see if the variability in Y is rather uniform across each value of X.

I would also want to note that when one variable is nominal (for example, men and women) and the other variable is interval (for example, GRE scores), a point biserial is appropriate. However, it always seems to make more sense to me to not determine the relationship (with the point biserial) between gender and GRE scores, but to determine if there is a significant difference between men and women on GRE scores. One would, of course, use inferential statistics for that analysis. Comparing the means for the men and women would be the descriptive dimension. If one tests a statistical hypothesis about the population means, then the analysis is inferential. Of course, if you wish to include a nominal variable as one of several variables in regression, then the point biserial is appropriate.

Correlational tools answer the question of "how do two things vary together?" The output, the number, must also be interpreted correctly or misuse occurs. See Appendix A for some guidelines. Errors often occur as I have seen Pearson r's reported on tables in our national professional meeting such as 1.23. How would this occur when the upper limit is 1? Simple! Someone messed up!

The next problem I see with correlations is misuse via interpretation of the significance of a correlation coefficient. Note the example (II.F.) in Appendix A. Researchers often will have a correlation of low magnitude, which indicates two "things" really are not varying together, but can report the correlation as "significant". I think computer printouts are often to blame for this because the matrix generated by the computer will often list the r and directly under it will be listed the "p", the probability level. A naive researcher frantically searching for something important to result from a study may examine the r's, find none of very high magnitude; but, alas, some are "significant". I perceive that many do not even realize what null hypothesis is being tested to produce this "p", and then they make a "big deal" about the significant correlation. Note in Appendix A how low in magnitude a correlation can be and still be "significant" because significance is a function of sample size. Refer to Appendix A (II.D.3.) for more appropriate ways to look at the "goodness" of a correlation coefficient.

## REGRESSION

The tools in this compartment are used principally to help explain/predict. However, some profess that they can serve an inferential function as well. The principal question which I identify with them is "how well can I predict Y from knowledge of X?" To me, this is the second question of relational studies, those which explain/predict. One must clearly understand that the method of collecting data, such as with a mailed questionnaire, does not dictate the type of research. What does is the purpose of the study and if the purpose of a study is to explain/predict, then the study can be relational. Of course, documentary analysis, secondary data analysis and many other means can be used to collect data.

This set of tools is becoming much more visible in the literature of the profession. Perhaps our new members have had more training in these procedures and are more comfortable with them.

The biggest concern I have with the use of these tools is with persons who once again forget the assumptions of the tools which permit their usage and proper interpretation. Many report significance and do not really explain what null hypothesis has been tested. I suspect many do not know whether they should report the t-test or the F-test, nor do they fully understand what has been tested with each. Many may not know the problems generated by multicolinearity, nor the implications of a truncated distribution or non-normal distribution. Some also seem to have trouble in constructing a table to adequately convey the data needed to properly interpret the results.

## INFERENTIAL: TOOL BOX #3

The tools in this box address the question of "what are the chances that I got my results by chance?" In other words, what are the chances that the difference I found between some groups was because of some quirk in my random assignment of persons to group and not because my treatment made any difference or that there is any real difference between the groups other than what may have occurred by chance alone. Given all the many tools and complex formulas, this simple question seems miniscule, but that is the real essence of what is being tested.

Each of the tools in this tool box has its own set of assumptions which must be met before that tool is utilized. The researcher has the responsibility of assuring the reader that they have been met. So, be sure you have met them and report that in the reports of your research. As illustrated in Figure 2, a driver down one of those streets comes to intersections at which information about the study and the nature of the data must be utilized to determine which test is appropriate. The basic purpose of these tools is to infer the properties of a population (parameters) from knowledge of the properties of a sample (statistics). These inferences are never made with certainty as there is always some risk of an incorrect decision. There is always the risk of making a Type I or Type II error, as most of you probably remember studying. Helpful ways to avoid these errors are provided in most statistics books.

The second concern which I have is with the difference between statistical significance and practical significance. For example, one might be using a 4-point Likert-type scale and find the mean of one group to be 2.27 and the mean of the second group to be 2.48. If the sample sizes are large enough, this small numerical difference of .21 can be statistically significant. However, the question is whether or not it is of any practical significance as both groups on the average may be falling near the midpoint between agreeing and disagreeing. Practically, how does the researcher make any sense out of such a finding? Some might go to great detail in describing how the groups are significantly different. There are tools such as omega squared which can be used to assess practical significance and I believe we ought to be "checked-out" on it, and ones similar to it, as well.

I believe that by omission we also underuse interval estimation. We could easily calculate confidence intervals in many cases, but fail to do so. Such calculations would be another way by which we could aid in the reporting of our research. Constructing confidence intervals around a sample statistic and on a population parameter would often add to our reports. This I see as an error of omission, and perhaps we do it because we were so thoroughly grounded in hypothesis testing that we just do not think to do it.

Two other concerns which I have seem almost paradoxical. The first is with the person who uses statistics to try to "snow" everyone, and the second is with the person who underutilizes the tools. In the first instance, research problems may be of small consequence or the objectives questionable, or perhaps the researcher really did not find anything; but proceeds to use some highpowered statistical tool such as a canonical correlation, MANOVA, factor analysis, cluster analysis, probit analysis, logit analysis, analysis of covariance; whether or not it is needed to address the objectives of the study. Oh, those tools have their place, do not misinterpret what I am implying, but when they are misused, given the purpose of the study, then I take offense.

Often when these studies are presented for consideration for journals or papers, the referees do not even know what was done with the data. I, for one, look it up and study it to determine for myself even if it means I have to spend several hours learning about,for example, Generalizability Theory to do it. I believe each of us, as professionals, have to assume that responsibility because the Editor of our journals cannot be expected to know the level of statistical sophistication of each person.

The latter person may posit hypothesis which imply that the results will be analyzed, for example, to determine whether or not one group is superior to another group on a given criterion. The data are subsequently reported only in descriptive ways, i.e., that the mean of one group is higher than the other. The reader is essentially asked to judge whether or not there is sufficient difference between the means to be meaningful. Such thinking, I believe, led Kerlinger and others to indicate that _ex_post_facto_ research must propose hypotheses and provide more than just descriptive information. The example provided would necessitate the testing of hypothesis, and the reader should not be left to make an independent judgment.

Since I am on the topic of hypothesis testing, let me relate a personal "pet peeve". I believe alpha levels should be set _a priori_, tested at that level, and reported at that level. Once again, I perceive that the computer is partially to blame because most printouts now list the "p" level. The researcher may have set an alpha level of .05 _a_priori_, but when the computer prints out a "p" level of .001 the researcher asterisks the observed score for the test of significance and lists .001 at the foot of the table. Why? I am particularly perplexed when the bottom of the table contains a whole array of probability levels ranging from .10 to .001. This is particularly worrisome when it already looks as though they are using an electron microscope to examine data collected with a steamshovel. I will grant you that I have less problem with subjecting data to a more robust test, for example, reporting alpha levels which put the data to a more stringent test, but to go from .05 to .10 would not be appropriate. Let me recommend to you the 1986 article in the _Educational_Researcher_ which presents a conceptual discussion of alpha levels and "p".

Another concern which I have is the use of statistics when one is studying a population. One must remember that statistics are characteristics of a sample and parameters are characteristics of a population. Statistics are symbolized by Latin or English letters and parameters are symbolized by Greek letters. Two scenarios should be drawn. The first is when a researcher is studying a finite population, such as the 16 state FFA officers, where every member of the population is being studied. When the data are analyzed in this situation, the researcher has parameters, and statistics are not used. Remember, that inferential statistics essentially asks the question of whether or not the data were the result of chance sampling. If everyone was studied, then there is no chance that the data are the result of chance sampling because no sampling was used. Therefore, no statistics are needed. Still, one frequently sees inferential statistics used with a population. The second scenario would be one in which one comparison group is a population and the second group is a sample as one might do in comparing the attitudes of state FFA officers with a random sample of chapter officers. That is a sample of one group and a population of the other. The appropriate procedure would be to construct confidence intervals around the sample statistic to determine if it captures the parametric value. The problem of using parameters could also be addressed logically from the standpoint of arguing that the data produced upon the population is really a statistics since the data are collected at one point in time, i.e., that this set of state FFA officers is a sample of others which will exist at other points in time, and then use inferential statistics instead of construction confidence intervals. The major point is that the researcher has the responsibility to develop either logic as appropriate for analyzing and interpreting the data.

## SUMMARY

One nice thing about being asked to speak somewhere is that you can share your personal biases. Today, you have heard some of mine. Essentially, my biggest concern is with whether or not we, as professionals and researchers, do enough to keep ourselves up-to-date in the area of statistics. Statistics may not be the favorite late-night reading topic for any of us, but we need to devote as much attention to these skills as we do to the technical skills of teaching, or the study of one of our content areas. Remember, we need to be "green and growing" when it comes to the study of statistics, too.

An additional caution was shared relative to the assumptions of any statistical procedure. The problem essentially is that we too often quickly decide, perhaps, what our analysis procedure will be before we have really examined our hypothesis, the design of our study, and the nature of our measurement to determine which is the single best tool. We all have seen people whose only tool in the house was a pair of pliers and thus they used it to hammer with, to extract or insert screws, to remove lamp ferrules, etc. We need to be sure that ANoVa, or some other tool, is not our pair of pliers. My Mother used to believe that a mixture of lard and kerosene, as a salve, could cure most anything, from scrapes to congestion with a cold. We now have more than this homemade salve. We need to learn to use the new medications as well.

Finally, I want to thank you for this opportunity to present my "biases" in this area. I would leave you with the final thought that research is an exciting endeavor. It can be fun, if you know the rules and procedures. We need to convey this enthusiasm to more of our graduates. Let's light their candle for conducting high quality research and prepare the next generation of researchers for agricultural education. Let's help them be persons who really love to do research and not people who see it as drudgery and a necessary evil of being employed in higher education. A legacy we can give future agricultural educators is not only the skills to properly conduct research but a refreshing vision that they can help contribute to knowledge and the application of that knowledge to help people.

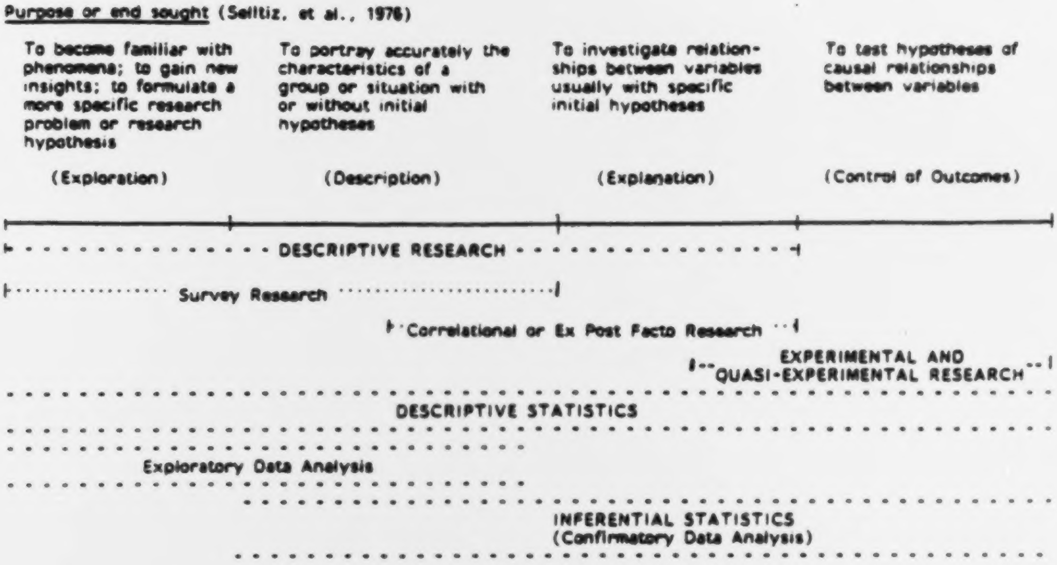
Purpose or end sought (Selltiz, et al., 1976)
To become familiar with phenomena; to gain new insights; to formulate a more specific research problem or research hypothesis
(Exploration)
To portray accurately the characteristics of a group or situation with or without initial hypotheses
(Description)
To investigate relationships between variables usually with specific initial hypotheses
(Explanation)
To test hypotheses of causal relationships between variables
(Control of Outcomes)
DESCRIPTIVE RESEARCH
Survey Research
Correlational or Ex Post Facto Research
EXPERIMENTAL AND QUASI-EXPERIMENTAL RESEARCH
DESCRIPTIVE STATISTICS
Exploratory Data Analysis
INFERENTIAL STATISTICS
(Confirmatory Data Analysis)

Figure 1. Purposes of Research, Types of Research, and Statistical Analysis

| Measure | Scale of Measurement | | |
|---|---|---|---|
| | Nominal | Ordinal | Interval or Ratio |
| Central Tendency (Location: score or category that best represents all in the distribution) | Modal Category | Median (50th percentile) | Mean<br>Median if skewed distribution |
| Variability (Spread: dispersion, heterogeneity, or scatter in the distribution) | Relative frequencies of categories | Semi-interquartile range<br>$Q=\frac{Q_3 - Q_1}{2}$<br>$Q_1$=25th percentile<br>$Q_2$=50th percentile (median)<br>$Q_3$=75th percentile | Variance<br>Standard Deviation<br>Range |
| Symmetry (Shape: degree to which the distribution is asymmetrical) | | | Skewness values indicating<br>symmetrical distribution<br>negatively skewed<br>positively skewed |

Figure 3. Descriptive Statistics: Measures of Central Tendency, Variability, and Shape of Distributions

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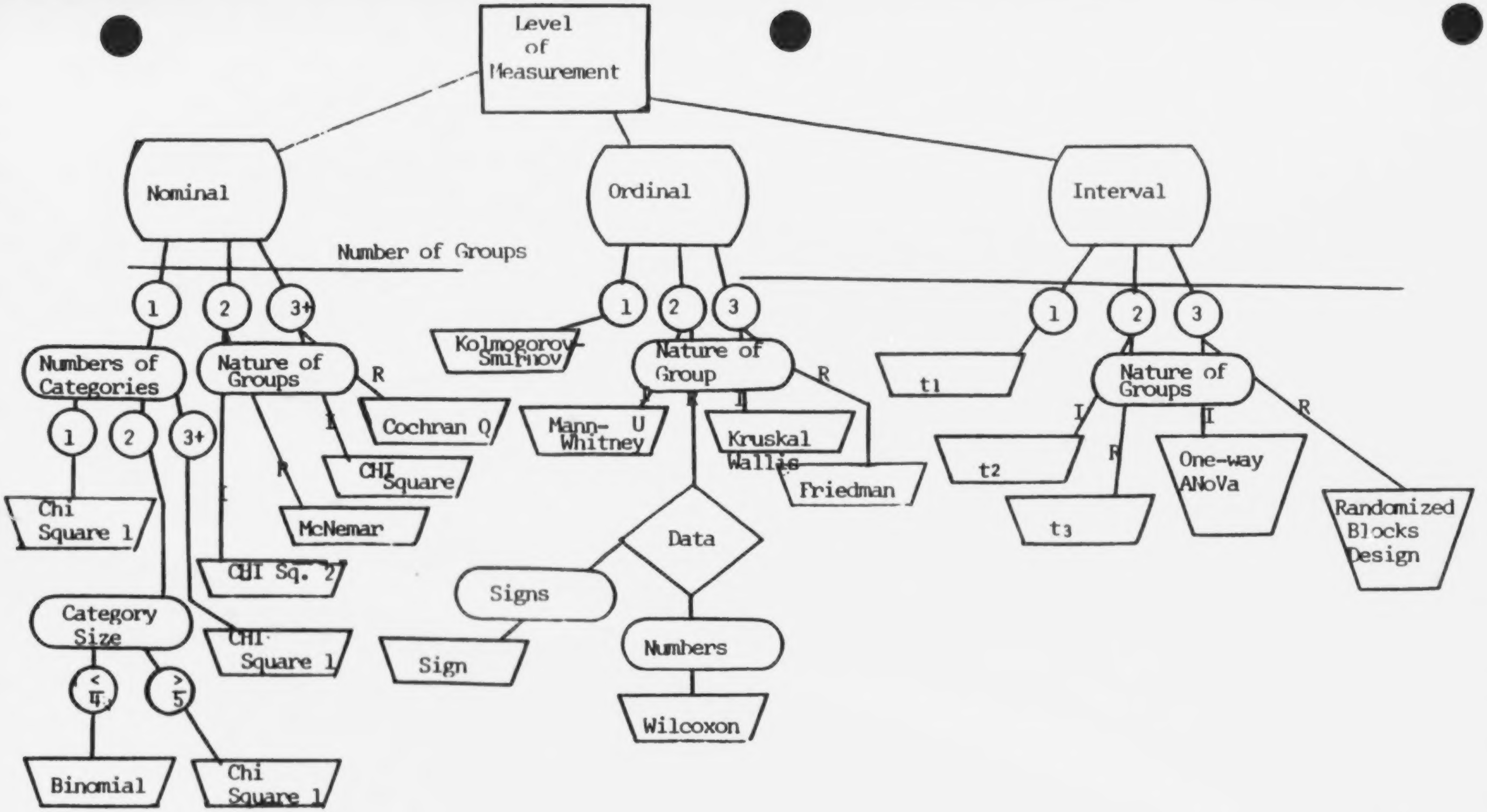
Level of Measurement
Nominal
Ordinal
Interval
Number of Groups
1
2
3+
Numbers of Categories
Nature of Groups
R
Cochran Q
I
CHI Square
R
McNemar
I
CHI Sq. 2
1
2
3+
Chi Square 1
Category Size
< 4
> 5
Binomial
Chi Square 1
CHI Square 1
1
2
3
Kolmogorov-Smirnov
Nature of Group
I
R
I
R
Mann-Whitney U
Kruskal Wallis
Friedman
Data
Signs
Sign
Numbers
Wilcoxon
1
2
3
t1
Nature of Groups
I
R
I
R
t2
t3
One-way ANoVa
Randomized Blocks Design

I = Independent group
R = Related group (Dependent or Correlated)

$X^2_1$ = Chi Square 1 = Goodness of Fit test
$X^2_2$ = Chi Square 2 = Difference between groups
$t_1$ = One group t-test
$t_2$ = Independent t
$t_3$ = dependent t

Figure 2. Simplified Statistical Decision Making Process

| Scale of Measurement<br>(Variable 1) | Scale of Measurement (Variable 2) | | |
|---|---|---|---|
| | Nominal | Ordinal | Interval or Ratio |
| Nominal | Phi coefficient<br>(2 x 2 Table)<br>Cramer's statistic<br>(R x C Table)<br>Hays, pp. 743-745) | | |
| Ordinal | Rank-biserial correlation coefficient<br>Glass and Stanley pp. 179-181 | Spearman rank-correlation coefficient<br>Hays, pp. 788-792<br>Kendall Tau' Coefficient<br>Hays, pp. 792-800 | |
| Interval or Ratio | Point-biserial correlation coefficient<br>Glass and Stanley pp. 163-165 | Convert interval scores to ranks and calculate Spearman rank-correlation or Kendall Tau | Pearson product-moment coefficient<br>Hays, pp. 631-636 |

Figure 4. Measures of Linear Relationship (Association)

| Scale of Measurement<br>(Variable 1) | Scale of Measurement (Variable 2) | | |
|---|---|---|---|
| | Nominal | | Ordinal<br>(Ordered Categories) |
| | Dichotomous | Multichotomous | |
| Nominal | | | |
| Dichotomous | Phi coefficient<br>Hays, pp. 743-745 | Cramer's statistic<br>Hays, pp. 743-745 | Convert ordered categories to nominal scale and calculate phi coefficient or Cramer's statistic |
| Multichotomous | Cramer's statistic<br>Hays, pp. 743-745 | Cramer's statistic<br>Hays, pp. 743-745 | |
| Ordinal<br>(Ordered Categories) | Convert ordered categories to nominal scale and calculate phi coefficient or Cramer's statistic | | Kendall Tau b<br>(square contingency tables)<br>Kendall Tau c<br>(rectangular contingency tables)<br>Nie et al., pp. 227-228 |

Figure 5. Measures of Association in Contingency Tables

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# APPENDIX A

## INTERPRETING CORRELATIONS

I. SIGN (Direction)*

A. Positive: Means line of best fit goes from lower left to upper right on scatterplot

: Means that as X increases, Y increases

B. Negative: Means line of best fit goes from upper left to lower right on scatterplot

: Means that as X increases, Y decreases

* Do not confuse sign with magnitude, e.g., +.6 } -.6

II. MAGNITUDE OF NUMBER (Correlation)

A. Numerical terms

-1.0 through 0 through +1.0

B. Verbally

Perfect negative through no relationship through perfect positive (Davis' descriptors, Appendix $A_1$)

C. Graphically

Straight line with negative slope

through

A rectangle or vertical line

through

Straight line with positive slope

D. Prediction

a. Perfect prediction of Y from knowledge of X through lack of any improvement in predicting Y from knowledge of X through perfect prediction of Y from knowledge of X

b. The lower the magnitude of the "r" the lower the ability to predict

3. Methods of indicating the "goodness" of prediction
    a. Standard error of the estimate
    b. Coefficient of determination $(r^2)$
    c. Coefficient of nondetermination $(1-r^2)$
    d. Coefficient of alienation $(K) = \sqrt{1-r^2}$
    e. Coefficient of predictive efficiency or Index of forecasting efficiency $(E) = 1-K$

EXAMPLE:

$$r = .8$$
$$r^2 = .64$$
$$1-r^2 = .36$$
$$K = \sqrt{.36} = .6$$
$$E = 1-K = 1-.6 = .4$$

E. Interpreting r

1. Tells degree of linear relationship between X and Y

2. Puts a line of "best fit" through the points on the scatterplot to minimize distance of the points to the line

3. Won't work with a curvilinear relationship or a heteroscedastic distribution; therefore, always do a scatterplot before calculating "r" to confirm linearity and homoscedasticity

F. Significance of a Pearson Correlation (a sample case)

The problem: What do they mean? You'll see significance levels (p) reported in research articles and on computer print-outs.

The null hypothesis tested is [$H_o$: $\rho$ (rho) = 0]: In the population there is no relationship between the variables.

EXAMPLE: In a study of 110 subjects a research finds $r = .20$ and $p < .01$. The "r" will often be noted in the table as significant, and subsequent discussion discusses the "significant" correlation. This does not relate to "goodness" of the "r" for prediction (albeit some may interpret it this way).

The question answered is: whether in the population the true correlation (remember: $\rho$, rho, is parametric symbol for a correlation) is $\rho = 0$, but an unlucky sample was drawn which produced this correlation.

To look at "goodness" of prediction, previous knowledge (#D above) would show:

$r = .2$ [Coefficient]

$r^2 = .04$ [Coefficient of determination; multiplied x 100, one could say that 4% of the variability in Y is accounted for by knowledge of X.]

$1-r^2 = .96$ [Coefficient of nondetermination; multiplied x 100, one could say that 96% of the variability in Y is unaccounted for by knowledge of X.]

$K = \sqrt{.96} = .98$ [Coefficient of alienation]

$E = 1-K = 1-.98 = .02$ [Index of forecasting efficiency]

CONCLUSIONS: (1) Don't report "p" for correlations unless you know what you are reporting.

(2) Know that "p" is highly dependent on "n" because $H_o$: $\rho = 0$, i.e., the bigger the sample the less chance of an "r" resulting from an unlucky sample. That is, if you study lots of subjects, an "r" of very small magnitude can be significant, but unimportant in a practical sense.

(3) Use this knowledge when you read research of others and they make a "big deal" about their significant correlations. You should use your knowledge of "goodness" to interpret the results for yourself.

# APPENDIX $A_1$

## ADJECTIVES TO DESCRIBE CORRELATIONS*

| r | Adjective |
|---|---|
| 1.0 | Perfect |
| .70 - .99 | Very High |
| .50 - .69 | Substantial |
| .30 - .49 | Moderate |
| .10 - .29 | Low |
| .01 - .09 | Negligible |

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*Davis, J.A. Elementary Survey Analysis. Englewood, NJ: Prentice-Hall, 1971.

# THE SIGNIFICANCE OF DOCTORAL RESEARCH IN AGRICULTURAL EDUCATION

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## INTRODUCTION/NEED FOR THE STUDY

From time to time a profession should pause, look at where it has been, examine the current situation, and make plans for the future. With the current emphasis on educational reform it would be appropriate for agricultural education to pause and examine itself. There are several aspects of the profession that could be examined, but one, that might provide an interesting picture of the profession, is doctoral research in agricultural education. According to Warmbrod (1986) research should be conducted on significant problems that are of concern to the profession. Is doctoral research in agricultural education doing that?

A decade ago Krebs (1976) indicated that research in agricultural education was not concentrating on the significant problems. He specifically faulted research in agricultural education for not being systematic nor focused on crucial problems.

Stewart, Shinn and Richardson (1977) identified the concerns of the profession and urged researchers to conduct research in the areas identified. However, Mannebach (1980) found that over one-fourth of the research being conducted was "nonapplicable" to the concerns of the profession and another 25 percent of the research was not in the areas of utmost concern. Since graduate students conduct over 3/4 of the research in agricultural education (Mannebach, McKenna, and Pfau, 1984) it would be logical to assume that much of the graduate student research is not on the topics of most concern to the profession.

During the past eight decades over 900 doctoral dissertations have been written on topics directly relating to or having impact on agricultural education. A critical examination of these doctoral dissertations may help the profession to determine if research in agricultural education is indeed a random "happening" on insignificant topics or if there is some order and significance to the research. If the research is found to be lacking, then the profession should take steps to rectify the situation.

## OBJECTIVES OF THE STUDY

The purpose of this research was to determine if there was a focus to doctoral research in agricultural education between 1900 and 1986; and if there was a focus, was the focus on the problems facing the profession. Basically, the researchers were trying to determine if doctoral research in agricultural education has been a systematic inquiry into the problems of the profession or a hodge podge of unrelated studies in a variety of areas that were not of major concern to the profession. Specific research questions were:

1. Which universities are the doctoral dissertations coming from?

2. What are the problems being researched in agricultural education and have they changed over the decades?

3. Do universities conduct systematic doctoral research?

4. Who are the people (American or non-American) conducting doctoral research in agricultural education?

5. Do doctoral research topics in agricultural education coincide with the concerns of the profession?

## METHODS AND PROCEDURES

This research employed historical research procedures. The target "population" for the research was all doctoral dissertations written on agriculture education topics. Agricultural education topics were identified as "those topics that have a major impact on the content, organization, and delivery of agricultural knowledge and skills to clients typically served by public school teachers and extension agents." Additionally, dissertations that examined historical, philosophical or professional issues in agricultural and extension education were included in the study.

After the problem was identified, data were collected. A computerized search coupled with a hand search of Dissertation Abstracts International (DAI) was conducted. Dissertations in DAI are identified by a descriptor category. "Education-Agricultural" has been used since 1976 as a descriptor title. Therefore, the term "Education-Agricultural" was the term used to search for dissertations in agricultural education between 1976 and 1986. Between 1964 and 1975 most agricultural education dissertations were in the descriptor category of "Education-Vocational". Prior to 1964 doctoral dissertation topics could be found under several categories including "Agriculture-General", "Education-General", and "Education-Administration". In the 1935 to 1950 era, the terms "Agriculture" or "Education" were used.

Dissertations prior to 1935 were found under the title "Education-Agricultural. " Dissertations Abstracts International came into existence in 1935. Dissertation Abstracts International has identified the dissertations prior to this time by contacting the doctoral granting institutions and obtaining lists of dissertations written prior to 1935. These pre-1935 dissertations have been categorized using the current descriptor categories.

After running computer searches using the various descriptor categories, one of the researchers manually examined the paper copies of Dissertation Abstracts International in many of the categories not computer searched in which a dissertation in agricultural education might possibly be located. Additionally, many early issues of Summaries of Studies in Agricultural Education were examined to see if any doctoral dissertations were listed that had not been identified by DAI.

After taking all the above mentioned steps, the researchers still have doubts that all the dissertations have been identified. We are still finding dissertations in categories that have not previously been searched. One problem that was encountered is that the person who wrote the dissertation selected the category descriptor from a list of descriptors provided by DAI. A person could write a dissertation on an agricultural education topic and classify it under a totally different category. To determine the extent of this possibility, the researchers compared the listing of dissertation authors found through the research procedures described with the current teacher educator directory published by AATEA and the U.S. Office of Education. The researchers did find several teacher educators who had not been identified previously. A computer search of DAI using the teacher educators' names was then conducted to identify the missing dissertations. There is a strong possibility that other dissertations on agricultural education topics have been missed or classified under descriptors not searched by the researchers. The cost of computer searching all descriptor categories where agricultural education dissertations "might" have been placed was prohibitive. The researchers are continuing their efforts to identify the dissertations.

The information collected by the research procedures described above included title of the dissertation, author, year of dissertation, and institution awarding the doctorate. Each dissertation title was examined and classified into one of 12 categories. The twelve categories were arrived at by examining the indexes used in The Agricultural Education Magazine and Summaries of Studies in Agricultural Education. Three people (two professors and one Ph.D. student) classified the dissertation titles. If there was a question as to the correct category the two professors discussed it until they agreed. The classification system used was similar to a key used in classifying plants using a YES-NO hierarchical branching system.

After the research was completed the researchers found that the category "professional concerns" was to broad and needed to be broken down into four or five additional categories such as "occupational and college success", "teacher tenure and job satisfaction", and "perceptions and attitudes toward agricultural education." The researchers are in the process of doing this. Those changes are not reflected in this paper.

The nationality of the dissertation author was also categorized by the panel of three people. Names were classified as either "Names Sounding American" or "Names Not Sounding American". If there was a question as to nationality, the researchers looked to see if the dissertation was on an international topic. It is realized that this could lead to some error in classification but it was the best the researchers could do with the data and resources available.

The third step was to synthesize the data. The date were placed in a computerized data base (Dbase III). Various combinations of data were retrieved from the data base for examination. Since the research was on the total population of dissertations no statistical analyses were performed other than frequency counts.

## RESULTS: FINDINGS, CONCLUSIONS, RECOMMENDATIONS

_At least_ 970 dissertations have been written on the topic of agricultural education. It should be noted that this research was not on doctorates awarded in agricultural education, but on dissertations written on the topic of agricultural education. A dissertation could be written in a history department on the history of agricultural education and being classified as agricultural education while a dissertation could be written in an agricultural education department on attitudes of agronomists concerning a government subsidy programs and not be classified as a doctoral study in agricultural education. The number of doctoral studies in agricultural education for any one university will probably not equal the number of doctorates awarded in agricultural education by that university.

### _Findings for Research Question 1_

1. Which universities are the doctoral dissertations coming from?

The first dissertation on the topic of agricultural education was written in 1906 at Clark University by James Ralph Jewell. The title of his dissertation was "Agricultural Education, Including Nature Study and School Gardens." This dissertation was followed in 1907 by a dissertation titled "Agricultural Education in America, with a Note on the Transvaal." This dissertation was written at the University of Minnesota by William McDonald. The final dissertation in the 1900-1909 era was written at Cornell University by Ora Sherman Morgan on the topic "The High School of Agriculture and Homemaking and its Function in the Modern Scheme of Education".

During the 1910 to 1919 era four dissertations were written on the topic of agricultural education. One was from Cornell, two were from Columbia University, and the final one was written by A. V. Storm at George Peabody College for Teachers.

The 1920 to 1929 decade saw a growth in doctoral research in agricultural education. Twenty-six dissertations were produced during this time period. Seven came out of Cornell, four were from Columbia, and four were from George Peabody College for Teachers. Other universities represented during this period included Illinois, Purdue, George Washington University, Indiana, Minnesota, Nebraska, Wisconsin, California, and Johns Hopkins.

Forty-eight dissertations were written on agricultural education during the 1930-1939 decade. Thirty (64%) of these were written at Cornell. During this decade Iowa State, Penn State, Missouri, and Ohio

State joined the ranks of institutions that had dissertations produced in agricultural education. Dissertations were also written at the University of Chicago (H. M. Hamlin), American University, and the University of North Carolina. Columbia had three (W. F. Stewart, Ray Fife, and G. A. Schmidt).

The 1940-1949 era saw a decline in doctorates dealing with agricultural education. Twenty-nine dissertations were identified during this decade. Twelve were from Cornell, five were from Penn State, Ohio State had four, and the remainder were spread between, Missouri, Illinois, Minnesota, California, and Stanford.

One hundred and fifty-six dissertations were written in the 1950-1959 era. The dominance of Cornell subsided during this decade. Eight different universities had 10 or more doctorates. The leading universities during the 1950-59 decade were: Ohio State - 24, Penn State - 23, Michigan State - 14, Illinois - 14, Cornell - 13, Louisiana State - 11, Minnesota - 11, and Missouri - 11.

There was a slight rise in doctoral studies in agricultural education during the sixties with 177 being written. Ohio State (31) produced the most studies followed by Penn State (19), Cornell (18), Michigan State (16), Oklahoma State (12) and Missouri (11). During the 1960s, doctorates on agricultural education topics were written at 29 different universities including such non-agricultural universities as the University of Houston, New York University, George Washington University, University of Indiana, Duke, University of North Carolina, Stanford, University of Alabama, and the University of Northern Colorado.

There was a rapid growth of doctoral studies during the 1970s. A total of 255 dissertations were written on agricultural education topics. Ohio State, with 55 dissertations, was far ahead of the next nearest university. Iowa State was second with 31 followed by Oklahoma State with 25. In the second echelon (10-19 studies) were Missouri, Penn State, Cornell, Illinois, and Louisiana State. Several new universities emerged during this era such as Texas A & M, Mississippi State, Virginia Tech, Kansas State, and Maryland.

The dissertations written between 1980 and 1986 (those listed through the January 1987 issue of Dissertation Abstracts International) were also examined. Two hundred and seventy-two studies were found. Three universities accounted for 42 percent of the studies. They were Ohio State (43), Iowa State (38), and Oklahoma State (32). Universities with 10 or more studies included Penn State (22), Missouri (18), Virginia Tech (15), Illinois (12), Louisiana State (11), and Cornell (10).

A listing of all universities producing at least 10 doctorates in agricultural education are found in Table 1. Eighteen universities have produced at least 10 dissertations on agricultural education topics. These 18 universities have been responsible for 861 dissertations (89%). Six universities have accounted for over half of the dissertations (566, 58%). They are Ohio State, Cornell, Penn State, Iowa State, Oklahoma State, and Missouri. Not listed in Table 1 is the 46 universities that have produced less than 10 dissertations on agricultureal education topics.

Table 1

Institutions That Have Had at Least Ten Dissertations on Agricultural Education Topics

| Institution | Pre-1930 | 1930-1939 | 1940-1949 | 1950-1959 | 1960-1969 | 1970-1979 | 1980-1986 | Total |
|---|---|---|---|---|---|---|---|---|
| Columbia | 6 | 4 | - | - | - | - | - | 10 |
| Cornell | 9 | 30 | 12 | 13 | 18 | 10 | 10 | 102 |
| Illinois | 2 | 1 | 2 | 14 | 8 | 12 | 12 | 51 |
| Iowa State | - | 1 | - | 5 | 8 | 31 | 38 | 83 |
| Kansas State | - | - | - | - | - | 7 | 7 | 14 |
| Louisiana State | - | - | - | 11 | 8 | 10 | 11 | 40 |
| Maryland | - | - | - | 1 | 2 | 6 | 5 | 14 |
| Michigan State | - | - | - | 14 | 16 | 6 | 8 | 44 |
| Minnesota | 3 | 1 | 1 | 11 | 7 | 9 | 5 | 37 |
| Mississippi State | - | - | - | - | - | 1 | 10 | 11 |
| Missouri | - | 2 | 3 | 11 | 11 | 17 | 18 | 62 |
| Ohio State | - | 2 | 4 | 24 | 31 | 55 | 43 | 159 |
| Oklahoma State | - | - | - | 3 | 12 | 25 | 32 | 72 |
| Penn State | - | 3 | 5 | 23 | 19 | 15 | 22 | 87 |
| Purdue | 1 | - | - | 3 | 3 | 6 | - | 13 |
| Texas A&M | - | - | - | - | 2 | 7 | 10 | 19 |
| Wisconsin | 1 | - | - | 2 | 7 | 8 | 3 | 21 |
| Virginia Tech | - | - | - | - | - | 7 | 15 | 22 |
| Totals | 22 | 44 | 27 | 135 | 152 | 232 | 249 | 861 |

## Findings for Research Questions 2

2. What are the problems being researched in agricultural education and have they changed over the decades?

There has been a marked evolution in the topics being researched in agricultural education. Prior to 1917 the dissertations were generally on the current status of agricultural education. After the passage of the Smith-Hughes Act there was considerable interest in three major areas - organization and administration, teacher training, and curriculum. These three area of concerns accounted for nearly fifty percent of the dissertations through the 1940 decade. An examination of dissertation titles during the 1930s and 1940s revealed seven dissertations that were concerned with educational programs for the Negro, all written at Cornell. A listing of dissertation categories by decade is found in Table 2.

Table 2

## Dissertation Topics in Agricultural Education by Decades

| Dissertation Topics | Pre-1930 | 1930-1939 | 1940-1949 | 1950-1959 | 1960-1969 | 1970-1979 | 1980-1986 | Total |
|---|---|---|---|---|---|---|---|---|
| International | - | 3<br>6% | - | 7<br>4% | 12<br>7% | 45<br>18% | 66<br>24% | 133<br>14% |
| Extension | - | 1<br>2% | - | - | 2<br>1% | 18<br>7% | 53<br>19% | 74<br>8% |
| History and Philosophy | 1<br>3% | 2<br>4% | 3<br>10% | 11<br>7% | 2<br>1% | 2<br>1% | 1<br>0% | 22<br>2% |
| Adult/Young Farmer/Post Secondary | - | 3<br>6% | 2<br>7% | 11<br>7% | 15<br>8% | 29<br>13% | 18<br>7% | 78<br>8% |
| Agricultural Mechanics | - | - | - | 12<br>8% | 16<br>9% | 26<br>10% | 25<br>9% | 79<br>8% |
| FFA | - | - | - | 1<br>1% | - | 11<br>4% | 12<br>4% | 24<br>2% |
| SOEP | 1<br>3% | 2<br>9% | 2<br>7% | 7<br>4% | 4<br>2% | 6<br>2% | 19<br>7% | 41<br>4% |
| Teacher Education | 6<br>18% | 9<br>19% | 9<br>31% | 32<br>21% | 16<br>9% | 32<br>13% | 20<br>7% | 124<br>13% |
| Curriculum/ Program Planning | 5<br>15% | 3<br>6% | 2<br>7% | 5<br>3% | 33<br>19% | 30<br>12% | 11<br>4% | 89<br>9% |
| Organization, Administration, Supervision | 7<br>21% | 5<br>10% | 4<br>14% | 5<br>3% | 8<br>5% | 4<br>2% | 2<br>1% | 35<br>4% |
| Teaching | 1<br>3% | - | 1<br>3% | 7<br>4% | 16<br>9% | 13<br>5% | 9<br>3% | 47<br>5% |
| Professional & General | 12<br>36% | 20<br>42% | 6<br>21% | 58<br>37% | 53<br>30% | 39<br>15% | 36<br>13% | 224<br>23% |
| Totals | 33 | 48 | 29 | 156 | 177 | 255 | 272 | 970 |

Percentages are for columns

During the 1950 decade more dissertations were written on teacher education than any other singular topic. The primary emphasis in many of the teacher education dissertations was on evaluation of existing teacher education programs. Five such dissertations came out of Ohio State with evaluations of Alabama Polytechnic, Ohio State, Tuskegee, Virginia State, and South Carolina State undergraduate teacher education programs. The first dissertations on agricultural mechanics surfaced during the 1950 decade with 12 being written.

In the 1960 decade there was an emergence of doctoral dissertations on curriculum/program planning and the effectiveness of different teaching strategies. There were nine studies on curriculum and training needs for off-farm agriculture. These nine studies were written after 1963.

It appears that there was a concerted effort between 1969 and 1971 in the Central Region to write dissertations on the effectiveness of different teaching strategies. There were 14 dissertations written in the Central Region with seven of these coming from Iowa State. The title of these dissertations typically started with the words "Experimental Evaluation" and examined such topics as transparencies, films, individualized instruction, demonstrations, field trips, prepared lesson plans, and audio tutorial teaching.

The trend for dissertations on curriculum/program planning (particularly off-farm agriculture) continued strong into the early 1970s but faded. Three other areas emerged during the 1970s, adult education, international, and teacher training. Eighteen percent of the dissertations during the 1970s were on international topics, 13 percent on adults, and 13 percent on teacher training. A number of dissertations were conducted on "professional or technical" competency needs of teachers.

Two themes accounted for about half of the dissertations during the 1980 era. Dissertations on international topics accounted for 24 percent of the dissertations and studies in extension accounted for 19 percent. There was only two studies on organization, administration, and supervision and only one on history/philosophy.

## Findings for Research Questions 3

3. Do universities conduct systematic doctoral research?

With a few minor exceptions there does not appear to be a programmatic emphasis in dissertations by institutions. A listing of dissertation topics by the leading universities and those in the Southern Region is found in Table 3. Two universities, the University of Missouri and Oklahoma State, have produced ten or more doctorates in agricultural mechanics. More dissertations on the FFA have been written at Virginia Tech and Ohio State than all other institutions combined. More dissertations on SOEP have been written at Iowa State than any other university. Cornell and Ohio State have produced large numbers of dissertations in teacher education and curriculum/program planning. The dissertations done at Cornell were primarily in the early decades of the profession while the ones at Ohio State were in the more recent era. Ohio

State also leads in the number of extension dissertations. When the number of dissertations on any particular topic at a single university are compared with the total number of doctorates produced at that institution, it becomes obvious that even though several dissertations may have been written on a similar topic during a short time period, it hardly constitutes a major institutional research emphasis.

Table 3

Dissertation Topics in Agricultural Education by Leading and Southern Region Institutions

| Dissertation Topics | CU | UI | ISU | LSU | MICH | MSU | UM | OHSU | OKSU | PSU | TAMU | VPI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| International | 18 | 8 | 10 | 4 | 5 | 1 | 4 | 12 | 18 | 11 | 2 | - |
| Extension | 1 | 1 | 8 | 3 | 1 | 4 | 2 | 23 | 10 | 4 | 1 | 3 |
| Hist./Philosophy | 2 | 4 | 1 | 2 | 1 | - | - | 2 | - | 2 | - | - |
| Adult/Young/PSec | 4 | 5 | 6 | 3 | 7 | - | 10 | 5 | 6 | 9 | 1 | 3 |
| Agr. Mechanics | 1 | 3 | 9 | 2 | 3 | 3 | 14 | 7 | 13 | 5 | 1 | 2 |
| FFA | - | - | 4 | 1 | 1 | - | 2 | 5 | 1 | - | 2 | 6 |
| SOEP | 7 | 1 | 10 | 3 | 3 | - | 2 | 7 | 1 | 1 | 1 | 1 |
| Teacher Educ. | 19 | 8 | 6 | 5 | 5 | 1 | 8 | 27 | 3 | 14 | 1 | 1 |
| Curriculum | 11 | 4 | 5 | 1 | 2 | 1 | 2 | 19 | 7 | 10 | 3 | 2 |
| Organiz. & Adm. | 6 | 2 | - | 1 | - | - | 2 | 9 | - | 1 | - | - |
| Teaching | 3 | 1 | 8 | 1 | 2 | 1 | 5 | 5 | 1 | 10 | 1 | 1 |
| Professional & General | 31 | 14 | 16 | 14 | 14 | - | 11 | 38 | 12 | 20 | 6 | 3 |

CU is Cornell University, UI is University of Illinois, ISU is Iowa State University, LSU is Louisiana State University, MICH is Michigan State University, MSU is Mississippi State University, UM is University of Missouri, OHSU is Ohio State University, OKSU is Oklahoma State University, PSU is Pennsylvania State University, TAMU is Texas A&M University, VPI is Virginia Tech

The university that may come the closest to having a programmatic research emphasis is Iowa State. The "Experimental Evaluation of Instructional Techniques" dissertations written at Iowa State during the 1969-1971 era emerged again at Iowa State in the 1980s but the emphasis was slightly different. Six dissertations were written on the evaluation of instructional materials; often dealing with SOEP or youth leadership.

Ohio State had five dissertations during the 1950s evaluating teacher education programs and Cornell had a number of dissertations on the Negro in the 1930s and 1940s. Three dissertations were written at Oklahoma State in 1980-1981 that revolved around a common theme; that of evaluating the instruction, research, and extension function of the Division of Agriculture at Oklahoma State.

One finding the researchers deem important has to do with dissertations on historical topics in agricultural education. Typically, the dissertations documenting the history of the profession were written at non-agricultural universities by people who are not known in agricultural education.

## Findings for Research Questions 4

4. Who are the people (American or non-American) conducting doctoral research in agricultural education?

There has been a marked change during the past two decades on the nationality of the student writing dissertations on agricultural education topics. Prior to 1970 over 90 percent of the dissertations were written by students with American sounding names. Prior to 1970 only 27 out of 443 dissertations were written by non-American students. The first recognizable international student dissertations, one a South African and the second a Filipino, were written in 1931 at Cornell.

Table 4

Origin of Students Writing Dissertations on Agricultural Education Topics by Decade

| Decade | American Sounding Name | Non-American Sounding Name | Total |
|---|---|---|---|
| Prior to 1930 | 33 (100%) | 0 | 33 |
| 1930 - 1939 | 45 ( 94%) | 3 ( 6%) | 48 |
| 1940 - 1949 | 29 (100%) | 0 | 29 |
| 1950 - 1959 | 149 ( 96%) | 7 ( 4%) | 156 |
| 1960 - 1969 | 160 ( 90%) | 17 (10%) | 177 |
| 1970 - 1979 | 201 ( 79%) | 54 (21%) | 255 |
| 1980 - 1986 | 196 ( 72%) | 76 (28%) | 272 |

The number of international students writing dissertations in agricultural education after 1970 has risen sharply. During the 1970s 21 percent of the dissertations were written by international students. This percentage rose to 28 percent during the 1980s. A visual display of this data is presented in Table 4.

## Findings for Research Questions 5

5. Do doctoral research topics in agricultural education coincide with the concerns of the profession?

After comparing the types of dissertations with the concerns of the profession by decade the researchers concluded there was some correlation between the concerns of the profession and the dissertations. For example, during the first two decades after the passage of the Smith-Hughes Act there was concern on how to organize programs and curricula and train teachers. These concerns are reflected in the dissertations. The agricultural mechanics component of the program was emphasized during the 1950s and the dissertations reflect that. After the passage of the Vocational Education Act of 1963 there was concern in the profession about how to change the curriculum for off-farm agriculture and this was addressed in the dissertations. The competency based approach to teaching was a concern in the 1970s and the dissertations reflect this. In the later 1970s and early 1980s the profession was advocating a return to the SOEP and this did show up in a number of dissertations.

The primary disparity in the dissertations has been during the current decade. There have been few dissertations addressing the excellence in education movement, the adoption of high technology in agriculture, or the need to readjust agricultural education for the future. There has been a decline in the percentage of dissertations on teacher education, curriculum, teaching, organization and supervision, adult education, and agricultural mechanics during the 1980 decade. By looking at the dissertations during the past six years one would have to conclude that international development and extension education programs are the major concerns of the profession.

## Conclusions and Recommendations

There have been changes in the institutions that are producing the doctorates. Some universities have emerged and then receded. Other universities have remained fairly constant. During the past 15 years several new universities have starting producing doctorates. Currently no one institution totally dominates the field. There are at least 11 institutions that have an adequate size faculty to offer a quality doctoral program and do produce a respectable number of doctorates. The researchers view this positively as this allows for some diversity in the profession.

A variety of topics in agricultural education have been researched by doctoral students. The topics being researched have changed over the years. Early topics had to do with organization and administration of vocational agriculture, curriculum and teacher training. Later topics have tended to concentrate on international and extension education.

The topics being researched in agricultural education are often on problems facing the profession. However, these dissertations are often reactive instead of proactive; they are after-the-fact. Dissertations in agricultural education have not been forward looking. For example Congress said agriculture would change in 1963 and the dissertations after that reflected the change. The dissertations prior to 1963 did not indicate change was needed. Doctoral dissertations in agricultural education tend to emphasize the status quo. There is room for improvement on selecting dissertation topics, especially in the current era.

With a few minor exceptions there appears to be no truly systematic research emphasis by institutions or within the profession. Doctoral research in agriculture education does not appear to have a focus. Over the years several universities have had a series of dissertations on the same general topic. This would appear to constitute a research focus for a university but when one realizes the number of dissertations on the same topic were among a far larger number of dissertations awarded by the institution during the decade, it would be difficult to construe this as a research focus. Additionally, whatever focus there was lasted for only a short time. The researchers laud the limited efforts that have been done but would encourage the profession to work harder at systematizing the knowledge base of the profession.

There has been a steady growth since the 1970s in the number of doctoral studies written by international students. Nearly one-third of the studies in agricultural education are now conducted by international students. Whether or not this is desirable depends upon the philosophy of each individual.

The above findings and conclusions present an interesting picture of doctoral research in the agricultural education profession. The researchers have attempted to present an accurate image of doctoral studies in agricultural education, similar to the image one would see by looking into a mirror. It is up to the people who view the reflection to determine if they like what they see or if they need to do something to improve the object that is emanating the image.

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# IDENTIFICATION OF SCIENCE-RELATED COMPETENCIES TAUGHT IN VOCATIONAL AGRICULTURE PROGRAMS IN LOUISIANA

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## INTRODUCTION

In recent years, considerable attention has focused upon improvement of student competence in the field of science at the secondary school level. Many states have mandated revisions in the high school curricula so as to increase the required number of science credits needed for graduation. Typically, these revisions have meant that high school students would enroll in additional science courses such as general science, biology or chemistry.

In the past, little consideration has been given to the potential for teaching science competencies in other than traditional science courses. The Association for Supervision and Curriculum Development (ASCD, 1985) reports that as a result of new academic credit requirements, students merely "take more of the usual courses in the traditional subjects." The report further charges that, "Most states have neither sought to identify the content of additional courses, nor have they generally appropriated new dollars to upgrade curriculum and instruction." The concluding result is that the approximately 24 percent of students who choose to enter the work force after graduation may be harmed by the new requirements (AVA, 1985).

As the number of required courses has increased, the number of elective courses available to the student has simultaneously decreased. In most cases, vocational education courses are considered as elective courses. Consequently, enrollments in vocational education have decreased as the number of required high school courses has increased. Dyrenfurth (1985) conducted a national survey of high school graduation requirements and concluded,

> In state after state, the number of 'basic' courses required for graduation is being increased. The variable result is a single-focus curriculum that gravely underserves students, for they will have little or no time left in their secondary school years to take practical arts and vocational subjects (p. 43).

However, some states are examining vocational education courses such as vocational agriculture for use as a means of teaching science competencies to high school students. In a limited number of states, students completing a sequence of vocational courses are allowed to substitute those courses for required science credit. A survey conducted in 1985 by the Delaware Department of Public Instruction shows that eleven states had policies which allowed vocational credit to be counted in lieu of science or math, sixteen states gave local school districts the authority over course credit approval, and three states had a policy that prohibited allowing vocational credit as a substitute for mathematics, science or any required subjects (Stewart, 1985).

Only two references are made specifically to vocational agriculture in the 1985 Delaware study. In Oklahoma, the State Board of Education adopted a policy which allows a school to waive a unit of credit in mathematics and a unit of credit in science providing a student completes six units of credit in vocational agriculture. One unit of credit in either math or science may be waived if a student completes at least three units of vocational agriculture. A similar arrangement for waiving required credit exists for vocational home economics in Oklahoma. In Virginia, a state policy allows for completion of a sequence of courses for occupational preparation in agriculture as an alternative to the requirement of a math or science course in the diploma program.

Since 1985, several states (Illinois, Missouri, North Carolina, Texas) have initiated studies of the relationship between science competencies taught in traditional science courses and competencies taught in vocational agriculture. The studies report that a substantial overlap exists between science competencies and agricultural competencies or objectives. For example, Briers (1986) conducted a study to determine the extent to which vocational agriculture in Texas provided opportunities for students to develop concepts and skills in mathematics and science. Seventy-five percent of the topics taught in vocational agriculture were judged by a panel of science teachers as developing concepts and skills in science.

The study by Briers supports the popular belief held by many in the profession that vocational agriculture is heavily laden with science-related instruction. However, care should be exercised in making broad generalizations for all of vocational agriculture based upon the findings of a limited number of studies. Thus, this study was conducted to determine the extent of science-related instruction in vocational agriculture in Louisiana. The study is of value to educators in other states as a model for examining the relationship between state approved science courses and vocational agriculture.

## PURPOSE AND OBJECTIVES

The purpose of the study was to determine the extent to which science-related instruction occurs as a part of instruction in vocational agriculture. In order to achieve this purpose two objectives served as guidelines in the performance of the project.

1. To identify instructional objectives in the Basic Program of Vocational Agriculture in Louisiana which were similar to competencies taught in state-approved science courses.

2. To determine the amount of time spent in vocational agriculture programs in Louisiana on science-related vocational agriculture instruction.

## PROCEDURE

To accomplish the objectives previously outlined, the basic curriculum guide for agriculture and the competency outlines for science were examined to identify possible objectives in agriculture that were science-related. The state-adopted curricula for the high school science courses, biology, chemistry, earth science, environmental science, general science, physics, and physical science, were used as the source for identifying the competencies taught in high school science programs.

The Basic Program of Vocational Agriculture in Louisiana (Bulletin 1690, Vols. I, II, III) was used as the source for identifying agricultural objectives taught in Louisiana vocational agriculture programs. This curriculum guide was published in 1983 by the Office of Vocational Education, Louisiana Department of Education, and is used in all programs throughout the state. This basic program of studies, also referred to as Vocational Agriculture I and Vocational Agriculture II, is the foundation for more specialized training at the 11th and 12th grade levels. Major emphasis at the 9th and 10th grade levels is placed on agricultural sciences, leadership and exploratory work experiences in agricultural production and agribusiness occupations (State Department of Education, 1980).

Two groups of knowledgeable personnel assisted in the identification of the science-related objectives. Input from a random sample of Louisiana vocational agriculture teachers was sought to determine science-related instructional objectives and time spent on science-related instruction. Two-hundred sixty eight vocational agriculture teachers comprised the population from which the research sample was drawn. A sample size of 158 was determined using the formula for calculating the sample size needed when the size of the population is known and the response measure dichotomous as discussed in Educational and Psychological Measurement by Krejcie and Morgan (1970). The formula was calculated using a 95% confidence level for the table value of chi-square and 0.05 as the degree of accuracy expressed as a proportion.

A select sample of 15 Louisiana science teachers were asked to verify the appropriateness of the objectives identified as science-related by the vocational agriculture teachers. The science teachers were knowledgeable of vocational agriculture and served to further validate the objectives as being science-related.

A survey instrument was developed, validated, field tested, and sent to the sample of vocational agriculture teachers. The teachers were asked to determine if the listed objectives were science-related and to indicate the amount of time spent teaching the objectives. After the instructional objectives were identified, a second instrument showing the relationship between the agricultural objectives and science competencies was sent to the sample of high school science teachers for validation of the similarity of the objectives.

## RESULTS

Usable information was obtained from 112 respondents or 71% of the sample. Five (10%) of the nonrespondents were contacted by phone and administered the questionnaire. The data collected indicated no bias existed in the non respondents.

A total of 76 instructional objectives from the Basic Program of Vocational Agriculture in Louisiana curriculum guide were identified as being science-related. The greatest similarity between the curricula in vocational agriculture and a specific high school science course is in Environmental Science. Fifty-four agricultural objectives were of similar content to the objectives taught in environmental sciences. It was also found that 20 of the 76 objectives overlapped with two or more science courses. For example, the objective "label and define essential parts of the digestive system" is taught in both biology and general science. The science-related agriculture objectives identified in the study are shown in Tables 1 and 2.

To further document the teaching of these science-related instructional objectives, the vocational agriculture teachers indicated the amount of instructional time spent in teaching the objectives. A summary of the allocated instructional time as established in the document, Vocational Agriculture/Agribusiness Program Planning (Bulletin No. 1570) is shown in Table 3 along with the average hours of science-related instruction reported by the teachers. The basic curriculum is divided into nine subject matter categories for each year of instruction. Additionally, hours are set-aside for local options by the teacher to better meet student and community needs. Science-related instruction as a percentage of allocated hours is also shown in Table 3.

The greatest percentage of allocated hours spent in science-related instruction is in the instructional area of soil science. Teachers reported spending 19 hours of instructional time teaching science-related instructional objectives in Vocational Agriculture I and 16 hours in Vocational Agriculture II. In both cases these figures are greated than the allocated hours suggested by the State Department of Education. In other words, it takes longer to teach the soil science instructional area than is suggested by state guidelines.

Two instructional areas, career information and agricultural leadership, were perceived by the teachers as containing no competencies that were science-related. The percentage of allocated time for these two areas for Vocational Agriculture I and II is 17% of the total instructional time.

Overall, the teachers reported that approximately one-third (32%), Vo-Ag I; 35%, Vo-Ag II) of the instructional time spent in teaching vocational agriculture in Louisiana is spent on science-related instruction. Implications of these findings for vocational agriculture programs in Louisiana are discussed in the conclusions and recommendations that follow.

Table 1

Agricultural Objectives in the Basic Program of Vocational Agriculture in Louisiana Overlapping with Competencies Taught in Biology, General Science, and Physical Science.

| Biology | General Science | Physical Science | AGRICULTURAL INSTRUCTIONAL OBJECTIVES |
|---|---|---|---|
| * | | | Define new plant science terms. |
| * | | | List the parts of the plant and identify their functions. |
| * | | | Describe the history of crop improvement. |
| * | | | Identify causes of disease. |
| * | | | Identify by name the various parts of livestock and poultry. |
| * | | | Identify by locations the various parts of livestock and poultry. |
| * | | | List the six classes of nutrients. |
| * | | | Identify the function of nutrients. |
| * | | | Outline the classification and nomenclature of feedstuffs. |
| * | | | Identify the sources of feedstuffs representing essential elements. |
| * | * | | Label and define essential parts of the digestive system. |
| * | * | | List the anatomy and functions for the male and female. |
| * | * | | Describe the reproductive process for mammals and poultry. |
| | * | * | Define electrical terms. |
| | | * | Name the two basic types of circuits. |
| | | * | Identify the types of conductors and insulators. |

Table 2

Agricultural Objectives in the Basic Program of Vocational Agriculture in Louisiana Overlapping with Competencies Taught in Earth Science, Environmental Science, Chemistry and Physics.

| Earth Science | Environmental Science | Chemistry | Physics | |
|---|---|---|---|---|
| * | * | | | Define soil. |
| * | * | | | Distinguish between surface soil and subsoil. |
| * | * | | | Identify the six main soil areas in Louisiana. |
| * | * | | | Describe a soil profile. |
| * | * | | | Identify the various soil horizons in a soil profile. |
| * | * | | | Describe soil formation. |
| * | * | | | List the factors responsible for soil formation. |
| * | * | | | Name the factors of most influence on soil formation. |
| * | | | * | Demonstrate the water holding capacities of soils. |
| * | | | * | Determine soil water availability. |
| * | | | * | List the ways available water can be lost by soils. |
| * | | | * | Name factors important in determining water movement in soil. |
| | * | * | | Make chart of pH scale to show acidity and alkalinity. |
| | | * | | Make laboratory tests for acidity of common products. |
| | * | * | | Explain how calcium affects soil acidity and availability of elements. |
| | | * | | Explain how pH symbols are used in denoting acidity/alkalinity. |
| | * | * | | Describe the conditions that lead to soil acidity/alkalinity. |
| | * | * | | List the pH ranges of the major crops. |
| | * | | | Explain where energy comes from to carry out nitrogen transformations. |
| | * | | | Name one type of bacteria involved in the nitrogen cycles. |
| | * | | | Discuss the symbiotic relationship between bacteria and plants. |
| | * | | | Specify where the bacteria are located in the root of plants. |
| | * | | | Discuss nitrogen fixation. |
| | * | | | Describe components of plant's underground environment. |
| | * | | | Describe components of plant's above ground environment. |
| | * | | | List the optimum growth conditions for different plants. |
| | * | | | Explain how plants obtain carbon, oxygen, hydrogen, and nitrogen. |
| | * | | | Describe the nitrogen cycle. |
| | * | | | List some sources of inorganic fertilizers. |

Table 2 continued

| Earth Science | Environmental Science | Chemistry | Physics | |
|---|---|---|---|---|
| | * | | | List some sources of organic fertilizers. |
| | * | | | Identify reasons for using chemicals safely. |
| | * | | | List ways chemicals can harm the environment. |
| | * | | | List ways chemicals move through the environment. |
| | * | | | Define residues. |
| | * | | | Define tolerances. |
| | * | | | List chemical and biological properties of soils. |
| | * | | | Explain how chemical or biological properties affect nature of soil. |
| | * | | | Name the microorganisms found in soil. |
| | * | | | List soil microorganisms that are beneficial to farmers. |
| | * | | | Describe the role of higher forms of plant and animal life in soil. |
| | * | | | Interpret organic matter content of surface soil using soil color. |
| | * | | | Interpret internal drainage of subsoil by observing soil color. |
| | * | | | Distinguish between "light" and "heavy" soils. |
| | * | | | Determine the texture of a soil sample. |
| | * | | | Classify a soil sample using the textural triangle. |
| | * | | | Explain the effects of soil structure on productivity. |
| | * | | | State the management practices to obtain proper soil conservation. |
| | * | | | Determine best possible use of land according to soil factors. |
| | * | | | List the farming types found in Louisiana and the U.S. |
| | * | | | State approximate acreage for producing different crops. |
| | * | | | Identify the three primary elements and functions in plant growth. |
| | * | | | Compare advantages and disadvantages of fertilizers. |
| | * | | | Identify different conditions of plant when fertilizer is lacking. |
| | * | | | Identify harmful insects and describe destructiveness. |
| | * | | | List and discuss the reasons weeds are harmful. |
| | * | | | Recognize and describe the symptoms and effects of plant diseases. |
| | * | | | List signs of ill health and identify causes of disease (Ansc.). |
| | * | | | Identify safety precautions when applying herbicides. |
| | * | | | List general precautions for mixing herbicides. |
| | * | | | List characteristics of major groups of insecticides by chemical makeup. |

Table 3

Allocated Instructional Time and Science-Related Instructional Time by Subject Matter Areas for the Basic Program of Vocational Agriculture in Louisiana

| Instructional Area | Vocational Agriculture I | | | Vocational Agriculture II | | |
|---|---|---|---|---|---|---|
| | Hours of Allocated Instruction | Hours of Science-Related Instruction | Percent of Allocated Hours | Hours of Allocated Instruction | Hours of Science-Related Instruction | Percent of Allocated Hours |
| Soil Science | 16 | 19 | 119% | 15 | 16 | 106% |
| Plant Science | 20 | 14 | 70% | 17 | 10 | 59% |
| Animal Science | 24 | 10 | 42% | 15 | 10 | 67% |
| Agricultural Mechanics | 29 | 4 | 14% | 28 | 4 | 14% |
| Orientation to Vo-Ag | 13 | 2 | 15% | 10 | 0 | 0% |
| Career Information | 6 | 0 | 0% | 8 | 0 | 0% |
| Agricultural Leadership | 28 | 0 | 0% | 15 | 0 | 0% |
| Environmental Protection | - | - | - | 6 | 4 | 67% |
| Energy Conservation | - | - | - | 4 | 1 | 25% |
| Local Option[a] | 34 | 6 | 18% | 52 | 15 | 29% |
| TOTAL | 178 | 55 | 32% | 170 | 60 | 35% |

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[a] In addition to the instructional areas included in Vocational Agriculture I and II, additional hours are allocated to be used as a local option to better meet student and community needs.

## CONCLUSIONS/RECOMMENDATIONS

The following conclusions and recommendations are made on the basis of this research study.

### Conclusions

1. A substantial number of science-related instructional objectives are included in the *Basic Program of Vocational Agriculture in Louisiana* and are being taught in vocational agriculture programs.
2. The *Basic Program of Vocational Agriculture in Louisiana* contains science-related objectives in both levels of instruction, Vocational Agriculture I and Vocational Agriculture II, with instructional time spent on those objectives being approximately equal.
3. The *Basic Program of Vocational Agriculture in Louisiana* includes overlapping objectives with each of the state approved science courses with the most overlap occurring for the science course, Environmental Sciences.
4. The instructional area, soil science, of the *Basic Program of Vocational Agriculture in Louisiana* is where the greatest number of science-related competencies are found and where the greatest science-related instruction is occurring.

### Recommendations

1. In this study only the basic curriculum (Vo-Ag I and II) was examined. A similar study should be conducted for the advanced curriculum (Vo-Ag III and IV).
2. Since a substantial number of agricultural objectives overlap with the state-approved science course, Environmental Science, substitute credit for completion of Vocational Agriculture I and II should be sought for this course.
3. Since the amount of time spent in science-related instruction as part of the local option is relatively low, teachers should be surveyed as to the content of the local option instruction and materials developed that emphasize science-relatedness where appropriate.

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# VOCATIONAL AGRICULTURE TEACHERS' OPINIONS OF FFA PROFICIENCY AWARDS

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## INTRODUCTION

FFA proficiency awards have been a part of the FFA awards program since 1944 (Bender & Taylor, 1974). Many agricultural educators continue to support the proficiency awards program for its educational value.

However, a problem appears to exist in this aspect of the high school vocational agriculture program in Louisiana and possibly in other states. For example, less than 15% of the teachers in the state had students apply for these awards in 1985. In addition, it appears that the same teachers have students apply for these awards on an annual basis while most teachers in the state do not have students participate in this program at all (R. Sullivan, personal communication, May 8, 1985).

A review of the literature revealed that a limited amount of research had been conducted in the area of proficiency awards. In a related study, White and Christiansen (1978) reported that the teaching interests of vocational agriculture teachers were correlated with over half of the contests entered by their students.

Ricketts and Newcomb (1984) studied the leadership and personal development abilities possessed by high school seniors who were members of superior and non-superior FFA chapters and by seniors who were never enrolled in vocational agriculture. They reported that chapter activeness had a higher relationship to leadership and personal development abilities possessed by FFA members than activeness at district or regional, state, and national levels.

Drake (1982) may have addressed one reason why teachers do not have students applying for proficiency awards. He maintains that it is a fantasy to believe that teachers of agriculture can or are willing to carry out the many expectations held for their positions. Drake stated that the super person fantasy may well be the most serious professional problem currently facing agricultural education.

This study was initiated to determine why some Louisiana teachers have students apply for proficiency awards on a regular basis while most teachers never have students apply. The results of this study should help the state staff in their efforts to improve the proficiency awards program in Louisiana.

## PURPOSE AND OBJECTIVES

The purpose of this study was to assess vocational agriculture teachers' attitudes towards the FFA proficiency award program and to determine what factors are related to whether a teacher had students apply for these awards. The objectives were:

1. Determine the attitudes held by Louisiana vocational agriculture teachers towards the FFA proficiency awards program.
2. Determine if selected factors were predictors of whether a teacher had students apply for proficiency awards. The factors included years teaching experience, years vocational agriculture in high school, number of vocational agriculture teachers in the school and percent rural students in the program.
3. Determine if differences existed in teachers attitudes toward the proficiency awards program between those teachers who had students apply in 1985 and those who did not.

## PROCEDURE

### Instrumentation

A questionnaire was developed to secure the information needed for this study. Items for the questionnaire were selected after a thorough review of the literature. The semantic differential scale used in the instrument was modified so that pairs of terms relative to proficiency awards were used in the scale rather than the 28 pairs of terms developed by Osgood, Suci and Tannenbaum (1957). It should be noted that semantic differential scales "attempt to get at connotative, rather than descriptive, meanings" (Popham, 1981). Popham also stated that since the evaluative dimension is the strongest of the three dimensions of meaning (semantic space, evaluation and potency), "it is generally recommended for use in semantic differential scales dealing with affect."

The questionnaire was examined for content validity by eight vocational agriculture teachers selected from those teachers who were not in the sample or population for the study. Two of these teachers had students apply for proficiency awards in previous years. The teachers reported that the instrument possessed content validity.

After the initial content validity procedure, the instrument was field tested with 15 teachers who were not in the sample selected for the study. Four of these teachers had students who had applied for proficiency awards in previous years. No modifications were indicated as being necessary by the field test.

The instrument that resulted from these procedures included a demographic information section, a 15 item section containing statements pertaining to proficiency awards with responses recorded on a Likert type scale (6 point, Strongly Disagree = 1, Strongly Agree = 6), and a modified semantic differential scale.

Reliability estimates calculated using Cronbach's Alpha (Cronbach, 1951) for the two scales in the questionnaire yielded the following estimates: Attitudes towards proficiency awards - $\underline{r} = .89$, and the semantic differential scale - $\underline{r} = .92$. These data indicated that the instrument possessed internal consistency.

### Populations and Sample

Two populations were identified. One consisted of all vocational agriculture teachers in Louisiana who had students apply for FFA proficiency awards in 1985. The other consisted of all teachers who did not have students apply for FFA proficiency awards in 1985. The year 1985 was used because this was the only year for which an accurate listing of applications was available. As a result of this limitation, the findings of this study apply to 1985 only.

All 37 teachers who had students apply for FFA proficiency awards were surveyed and 100% responded. This list was secured from the State Supervisor of Vocational Agriculture programs.

A sample of 126 teachers out of the 235 teachers who did not have students apply were randomly selected based on Cochran's formula (Snedecor and Cochran, 1980). A total of 106 teachers responded after two mailings and a phone follow-up of all non-respondents for a response rate of 84.1%. Independent sample t-tests were used to determine if differences existed between the mail and phone responses to the Likert and semantic differential scale items. The alpha level used for these tests was .01 which was the level preset for this study. Since no differences existed, the data were combined. As a result of these procedures, it was determined that the respondents were representative of the population of vocational agriculture teachers in Louisiana in 1985 who did not have students apply for proficiency awards.

### Data Analysis

Descriptive statistics were used to analyze the data for objective 1, stepwise multiple regression was used to analyze the data relative to objective 2 and one sample Student t-tests were used to analyze the data for objective 3 (Snedecor & Cochran, 1980). For the one sample t-tests, those teachers who had students apply for proficiency awards in 1985 were treated as the population and those teachers who did not have students apply were treated as the sample. The t-test was used to determine if the responses from the sample were statistically similar to the population or if they were different. The Alpha level was set at .01 to minimize the problems associated with multiple t-tests.

## RESULTS

### Attitudes Towards the Proficiency Award Program

The teachers' responses to statements about the proficiency award program are displayed in Table 1. The data show that both groups of teachers were in greatest agreement with the statement that "FFA awards motivate students." This statement received mean ratings from teachers who had students apply and those who did not of 5.70 (strongly agree) and 5.24 (agree), respectively.

Teachers who had students apply for awards gave their lowest rating (1.62, disagree) to the statement that "awards applications are a waste of my time." Teachers who did not have students apply gave their lowest rating (1.97, disagree) to the statement that "having students apply for awards is not a part of my job."

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Insert Table 1 about here

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Significant differences existed between the responses of the two populations for 12 of the 16 statements. Those teachers who had students apply for awards were in stronger agreement with the statements that awards help students to learn skills, FFA awards motivate students, winning awards is an indicator of student achievement, winning awards results in favorable local publicity, awards provide opportunity for recognition of student achievement, and winning an award results in improved self concept for the student. Those teachers who did not have students apply for awards were in stronger agreement with the following statements: awards applications aren't judged fairly, awards aren't available for the agricultural/agribusiness skills my students have, winning awards is not important to me, awards applications are a waste of my time, my students' SOE projects aren't good enough to compete against other students and I don't know how to fill out proficiency applications. These data are presented in Table 1.

## Stepwise Regression Analysis

Stepwise regression analysis was used to determine if selected factors were predictors of whether a teacher had students apply. The variables used in this analysis were years of teaching experience, years of vocational agriculture in high school, number of vocational agriculture teachers in the school, and percent rural students in the program.

Two variables, number of teachers and years teaching experience, were found to be statistically significant predictors of whether the teachers had students apply. The likelihood of a teacher having students apply increased as the number of teachers in a department increased and as the number of years teaching experience decreased. Even though these variables were found to be statistically significant predictors, they are not of practical significance since they only accounted for an $\underline{R}^2$ of .08. The results of this analysis are presented in Table 2.

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Insert Table 2 about here

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## Connotative Evaluation of Proficiency Awards Program

The teachers were also asked to evaluate the proficiency award program using a modified semantic differential scale. This evaluation was designed to further evaluate their attitudes towards proficiency awards. Those teachers who had students apply responded in a more positive manner towards the concept of proficiency awards than did those who did not have students apply. These data are presented in Figure 1.

Insert Figure 1 about here

## CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations are based on the findings of this study:

1. Teachers who had students apply were more likely to perceive that proficiency awards (a) help students to learn skills, (b) motivate students, (c) result in favorable local publicity, (d) provide opportunity for recognition of student achievement, and (e) result in improved self concept for the student. These factors relate to the qualitative aspects of the program. It was concluded that teachers who had students apply had more positive attitudes toward the proficiency award program than those who did not.

2. Those teachers who did not have students apply for awards did not disagree as strongly with the statements that their students' SOE projects weren't good enough to compete against other students and that they didn't know how to fill out proficiency applications. It was concluded that the quality of student SOE projects and knowledge of how to fill out the award applications may be factors that resulted in teachers failing to have students apply for the awards. These conclusions are valid for 1985 only, however, there is no reason to believe that the findings and conclusions would differ if the study would have been conducted using teachers who had students apply for proficiency awards over a period of several years. It is recommended that the state staff conduct workshops or other sessions for teachers on how to fill out the proficiency award applications and to acquaint them with the types and quality of SOE projects that are appropriate for the state proficiency awards program. Teacher educators should place more emphasis on these factors in the pre-service teacher education program.

3. The likelihood of a teacher having students apply increased as the number of teachers in a department increased and as the number of years teaching experience decreased. Even though these were significant predictors, they did not account for a practically significant portion of the variance. Further research should be conducted to determine the teacher related factors that contribute to a teacher either having students apply or failing to have students apply.

4. In the connotative evaluation of the program, teachers who had students apply for awards gave a "better" rating to the proficiency award program than did those teachers who did not have students apply. It was concluded that teachers who had students apply had a higher "opinion" of the program than the other group. These conclusions are valid for 1985 only, however, there is no reason to believe that the findings and conclusions would differ if the study would have been conducted using teachers who had students apply for proficiency awards over a period of several years. The state staff should work with those teachers who do not have students apply for awards to improve their opinion of the program.

## Recommendations for Further Research

1. This study should be replicated in five years to determine whether changes have been made as a result of this study.

2. Additional research should be conducted to determine the variables that are significant predictors of whether teachers have students apply for FFA proficiency awards. Knowledge of these variables could be used in designing and conducting pre-service and in-service training on proficiency awards applications.

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Table 1

Attitudes Held Towards Proficiency Awards by Whether Respondents Had Students Apply

| Statements about proficiency awards[a] | | No students applied | | 1 or more students applied | t |
|---|---|---|---|---|---|
| I have time to help students fill out applications | m | 4.22 | M | 4.24 | - .16 |
| | sd | 1.26 | SD | 1.36 | |
| | n | 104 | N | 37 | |
| Winning awards is an indicator of student achievement | m | 4.29 | M | 4.86 | -4.51*** |
| | sd | 1.40 | SD | 1.25 | |
| | n | 104 | N | 37 | |
| Class time should be used to fill out applications | m | 3.90 | M | 3.89 | .06 |
| | sd | 1.57 | SD | 1.68 | |
| | n | 104 | N | 37 | |
| FFA awards motivate students | m | 5.24 | M | 5.70 | -4.55*** |
| | sd | 1.03 | SD | .46 | |
| | n | 104 | N | 37 | |
| Winning awards results in favorable local publicity | m | 5.06 | M | 5.51 | -4.66*** |
| | sd | .98 | SD | .65 | |
| | n | 103 | N | 37 | |
| Awards provide opportunity for recognition of student achievement | m | 5.07 | M | 5.57 | -5.86*** |
| | sd | .87 | SD | .56 | |
| | n | 104 | N | 37 | |
| I don't know how to fill out proficiency applications | m | 3.15 | M | 2.30 | 6.03*** |
| | sd | 1.43 | SD | 1.13 | |
| | n | 103 | N | 37 | |
| Awards applications are a waste of my time | m | 2.07 | M | 1.62 | 4.76*** |
| | sd | .96 | SD | .86 | |
| | n | 103 | N | 37 | |
| Winning of an award by a student results in an improved self concept | m | 4.95 | M | 5.54 | -6.27*** |
| | sd | .95 | SD | .56 | |
| | n | 102 | N | 37 | |
| Awards help students learn skills | m | 4.59 | M | 5.14 | -5.15*** |
| | sd | 1.09 | SD | 1.03 | |
| | n | 104 | N | 37 | |

(table continues)

Table 1 (continued)

Attitudes Held Towards Proficiency Awards by Whether Respondents Had Students Apply

| Statements about proficiency awards | No students applied | | 1 or more students applied | | t |
|---|---|---|---|---|---|
| My students' SOE projects aren't good enough to compete against other students in the state | m<br>sd<br>n | 3.23<br>1.46<br>104 | M<br>SD<br>N | 2.16<br>1.28<br>37 | 7.47*** |
| Awards applications aren't judged fairly | m<br>sd<br>n | 2.57<br>1.24<br>98 | M<br>SD<br>N | 2.06<br>.94<br>35 | 4.07*** |
| Awards aren't available for agriculture/agribusiness skills my students have | m<br>sd<br>n | 2.44<br>1.10<br>102 | M<br>SD<br>N | 1.92<br>1.01<br>37 | 4.77*** |
| Winning awards is not important to me | m<br>sd<br>n | 2.64<br>1.19<br>104 | M<br>SD<br>N | 2.14<br>1.29<br>37 | 4.28*** |
| Having students apply for awards is not a part of my job | m<br>sd<br>n | 1.97<br>.81<br>103 | M<br>SD<br>N | 1.89<br>1.24<br>37 | 1.00 |
| Schools that apply for FFA Best Chapter Award should be required to have proficiency awards applications at the state level during the same year | m<br>sd<br>n | 3.53<br>1.67<br>103 | M<br>SD<br>N | 3.95<br>1.93<br>37 | -2.55 |

*$p<.01$, **$p<.001$, ***$p<.0001$

[a] 1=Strongly Disagree, 2=Disagree, 3=Slightly Disagree, 4=Slightly Agree, 5=Agree, 6=Strongly Agree

Table 2

*Multiple Regression Analysis of Whether Teachers Did or Did Not Have Students Apply for Proficiency Awards*

| Source | *df* | *SS* | *MS* | *F* |
|---|---|---|---|---|
| Regression | 2 | 2.22 | 1.11 | 6.21* |
| Residual | 137 | 24.52 | .18 | |
| Total | 139 | 26.74 | | |

Summary of Stepwise Regression Analysis on
FFA Proficiency Award Application Status

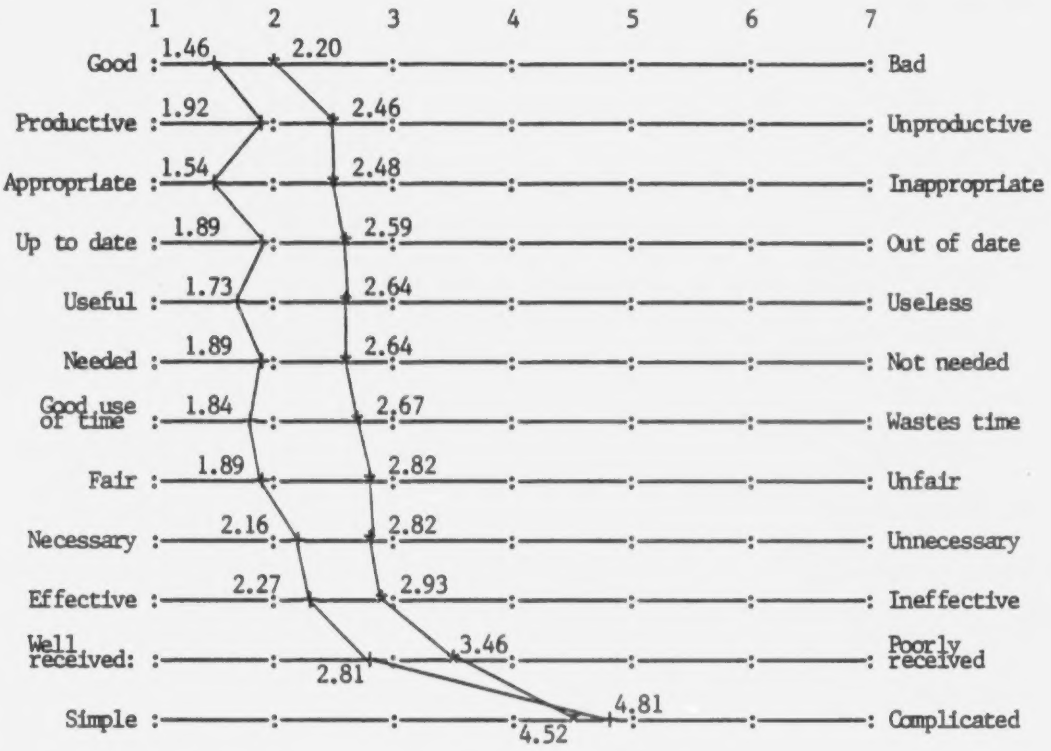
| Factor | $R^2$ | Cumulative $R^2$ | *F* |
|---|---|---|---|
| Number of teachers in voc. ag. department | .055 | .055 | 7.99* |
| Years teaching experience | .028 | .083 | 6.21* |

$^{*}p < .01$

Figure 1

Teachers' Connotative Evaluation of the Proficiency Award Program

The FFA proficiency awards program is:



NOTE. Numbers in the body of this figure represent the mean values for each pair of terms based on a seven point scale.

+ Teachers with 1 or more applications * Teachers with 0 applications

# COLLEGE ADMINISTRATORS' IMAGE OF THE AGRICULTURAL TEACHER EDUCATION PROGRAMS: A NATIONAL STUDY

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## INTRODUCTION

An image is comprised of the subjective knowledge of an individual about a specific object and determines how one behaves toward the object of the image (Boulding, 1966). The image one holds of the teacher education in agriculture program could, therefore, affect how one behaves toward the program. When the persons holding an image and behaving are administrators, the manifestation of the behavior can be of extreme importance to the program.

Image, as a precursor to behavior, has been defined as persistent over time, but amenable to change if considerable pressure is applied; as producing consistent behavior; and as having either a positive or negative direction. These tenets were supported by a cadre of writers (Dillman, 1978; Summers, 1970; Osgood, Suci and Tannenbaum, 1969; Chrisman, 1977; Fishbein, 1967; Remmers, 1972; Thurstone, 1974; Tigert and King, 1971; Dawes, 1972; McKennell, 1974; Shaw and Wright, 1967).

Measurement of the image construct has been investigated (Menezes and Elbert, 1979; Fisk, 1961; Kunkel and Berry, 1968). Image research has evolved from contemporary literature principally in marketing, although scientists, professional groups and higher education "prestige" studies have thematically lapped into the theory related to the construct. Boulding noted that images are formed and affected by messages. The messages received may not change the image at all, may change it somewhat, or may produce a revolutionary change. He noted messages are (1) neutral, does not affect image; (2) favorable, easily received; (3) hostile, hard to penetrate image; and (4) certainty, stabilizing the image (1966).

Crunkilton, Miller and Lee (1986) investigated the image of teacher education in agriculture as held by faculty in their three universities. They found ratings of image to be relatively positive, but they concluded there was a need for improvement, particularly in agriculture. They recommended that a study be conducted of the image as held by university administrators.

## PURPOSE AND OBJECTIVES

This study was conducted to put into perspective a major concern of agricultural education; specifically, the image of agricultural education as held by administrators of the colleges of agriculture and education. The reason for doing the study was that the knowledge of the status of the image of agricultural education would identify strengths and weaknesses of the programs, and, thereby, illuminate positive aspects of the image and the negative aspects that needed improvement.

The following objectives guided the research study:

1. Describe the image of agriculture teacher education programs (faculty, students, research, services, and general areas of concern) as held by the administrators in the colleges of agriculture and education.

2. Determine differences in image of agriculture teacher education programs as held by the administrators among the colleges, the different regions, and types of institutions.

3. Identify and describe the relationship between specified psycho-social characteristics of administrators in the colleges of agriculture and education and the image they held of the agricultural education programs.

## PROCEDURES

The descriptive survey type of research was utilized in this study. Content validity of the instrument was established using a panel of experts. Cronbach standardized reliability coefficient was found to be at the range of .46 to .85. Frame, selection, sampling, measurement, and non-response errors were controlled. Subjects selected for the study were the deans of the colleges of agriculture and education and the associate deans responsible for resident instruction in the institutions. The sampling frame was developed through a stratified (by type of institution and region) random sampling procedure from 360 (N) administrators. A total sample of 160 (n) administrators were involved in this study. Response rate was 83 percent after two mailings; however, 9 percent was unusable. Descriptive, correlational and inferential statistics were utilized.

## RESULTS

Administrators (Table 18) in the colleges of agriculture and education held a high image of the faculty (Table 1), services offered (Table 5), and the general areas of concern (Table 6) in agricultural education. However, the images of the students (Table 2), research (Table 3), and the teaching (Table 4) in agricultural education were moderate.

Agriculture administrators held a significantly higher image than education administrators on the faculty and student domains (Tables 7-9). Administrators in the South held a significantly higher image of research than did other administrators in the North, Central, and the West (Tables 10-11). Education administrators in the South held a significantly higher image of research than education administrators in the West (Tables 12-13). Agriculture administrators in the South held a significantly higher image of research than agriculture administrators in the the Central region (Tables 14-15). However, agriculture administrators in the West held significantly higher image of the general areas domain than did agriculture administrators in the South and Northern regions (Table 16). There were no significant differences detected between the image held by administrators in the different types of institutions (Table 17).

Correlation coefficients (Table 19) indicated low to moderate relationships between "contact with agricultural programs" while negligible to moderate relationships were detected between "location of agricultural education department" and the image held by the administrators. There were negligible to low associations between gender, rank, administration experience, college, agriculture or education teaching experience, first degree major, and enrollment in vocational agriculture and the image the administrators held regarding the agricultural education programs.

Some of the conclusions derived from this study were that the images of the faculty, services offered, and the general areas of concern in agricultural education were high. However, the images of the students, research, and the teaching in agricultural education were moderate.

Overall, affiliation with the college of agriculture or education, the regions the administrators were located, and the types of institutions with which the administrators were affiliated did not have major influence on the image the administrators held of the agricultural education programs.

## RECOMMENDATIONS

The agricultural education programs were expected to portray a high image. The administrators of the colleges of agriculture and education held a moderate image of the agriculture teacher education programs. If administrators perceived the image to be moderate at best, then, efforts could be made to realize the fullest potential of the image. If an improved image could be possibly acquired, professionals involved in agricultural education should eventually enjoy the benefits of being a collegial partner.

The profession must proceed to determine why our image is as it is. Is it merely because agricultural educators are very specialized in colleges of education and viewed as social scientists in colleges of agriculture. If agricultural educators are to affect the image, the profession must determine its antecedents and proceed to upgrade the image as appropriate.

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*Table 1.* Image of the Faculty in Agricultural Education by College of Agriculture and Education Administrators

| Statement rated | Type of Administrators (x̄/S.D.)<br>Agriculture Administrators (# of cases) n = 62 | Education Administrators (# of cases) n = 55 | Total (# of cases) n = 117 |
|---|---|---|---|
| 1. do not really care about their students.* | 9.2 (62)<br>1.7 | 8.7 (54)<br>2.3 | 9.0 (116)<br>2.0 |
| 2. are always well prepared for presentations, meetings, etc. | 7.5 (61)<br>1.9 | 7.6 (52)<br>1.9 | 7.6 (113)<br>1.9 |
| 3. are energetic, aggressive and articulate. | 7.7 (62)<br>1.8 | 7.1 (55)<br>1.9 | 7.4 (116)<br>1.8 |
| 4. make too many compromises for individual students.* | 6.5 (57)<br>2.4 | 5.2 (44)<br>2.8 | 5.9 (101)<br>2.6 |
| 5. are up to date and aware of current developments in their field. | 7.5 (59)<br>1.9 | 7.6 (52)<br>2.1 | 7.6 (111)<br>2.0 |
| 6. exclude others from their group.* | 7.3 (60)<br>2.3 | 6.1 (52)<br>2.8 | 6.7 (112)<br>2.6 |
| 7. are not in control of their destiny and react more than act.* | 6.8 (62)<br>2.4 | 6.5 (52)<br>2.5 | 6.6 (114)<br>2.4 |
| 8. are professional in their appearance. | 8.1 (62)<br>1.8 | 8.0 (55)<br>2.0 | 8.0 (117)<br>1.9 |
| 9. are systematic and structured. | 7.6 (59)<br>1.4 | 7.4 (51)<br>1.8 | 7.5 (110)<br>1.6 |
| 10. are good "team players." | 7.8 (61)<br>1.8 | 6.9 (53)<br>2.5 | 7.4 (114)<br>2.2 |
| 11. lack good scholarship.* | 7.1 (60)<br>2.1 | 6.0 (54)<br>2.4 | 6.6 (114)<br>2.3 |

*Table 1.* Image of the Faculty in Agricultural Education by College of Agriculture and Education Administrators (Continued)

| Statement rated | Type of Administrators (x̄/S.D.)<br>Agriculture Administrators (# of cases) n = 62 | Education Administrators (# of cases) n = 55 | Total (# of cases) n = 117 |
|---|---|---|---|
| 12. are effective teachers. | 8.1 (61)<br>1.6 | 7.8 (50)<br>1.6 | 7.9 (111)<br>1.6 |
| 13. those who have a lot of ability move out of agriculture into other areas.* | 5.6 (60)<br>2.2 | 6.3 (48)<br>2.5 | 5.9 (108)<br>2.4 |
| 14. are, overall, of poor quality.* | 8.3 (61)<br>2.3 | 8.2 (55)<br>1.9 | 8.2 (116)<br>2.2 |
| 15. conduct themselves in a very professional manner. | 8.1 (62)<br>1.4 | 7.9 (55)<br>1.9 | 8.0 (117)<br>1.7 |
| 16. are good collegial peers. | 7.9 (62)<br>1.5 | 7.4 (55)<br>2.1 | 7.7 (117)<br>1.9 |
| 17. associate only with each other.* | 7.1 (62)<br>2.3 | 6.0 (55)<br>2.7 | 6.6 (117)<br>2.6 |
| 18. are effective problem solvers. | 7.0 (59)<br>1.8 | 6.4 (49)<br>1.7 | 6.8 (108)<br>1.7 |
| Domain | 7.5 (62)<br>1.1 | 7.1 (55)<br>1.2 | 7.3 (117)<br>1.2 |

*Scale values were reversed for negatively-stated items.

Rating Scale

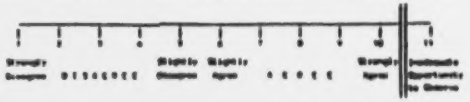

*Table 2.* Image of the Students in Agricultural Education by College of Agriculture and Education Administrators

|  | Type of Administrators ($\bar{x}$/S.D.) |  |  |
|---|---|---|---|
| Statement rated | Agriculture Administrators (# of cases) n = 62 | Education Administrators (# of cases) n = 53 | Total (# of cases) n = 115 |
| 1. follow rigorous programs of study. | 5.7 (62)<br>2.2 | 5.4 (53)<br>2.3 | 5.6 (115)<br>2.2 |
| 2. are scholarly. | 5.9 (62)<br>1.8 | 4.9 (52)<br>2.1 | 5.4 (114)<br>2.0 |
| 3. are of limited ability.* | 7.0 (60)<br>2.0 | 6.3 (50)<br>2.0 | 6.7 (110)<br>2.0 |
| 4. do not compare favorably with other students.* | 6.9 (61)<br>2.3 | 6.1 (50)<br>2.3 | 6.5 (111)<br>2.3 |
| 5. rate higher in leadership skills than most students. | 6.5 (61)<br>2.0 | 5.8 (47)<br>2.0 | 6.2 (108)<br>2.0 |
| 6. are typically in the lower half of a class on most academic endeavors.* | 6.9 (60)<br>1.9 | 5.4 (45)<br>2.0 | 6.3 (105)<br>2.1 |
| 7. possess better human relations skills than most students. | 6.8 (60)<br>2.0 | 5.6 (44)<br>2.2 | 6.3 (104)<br>2.1 |
| 8. are more studious than most students. | 5.1 (60)<br>1.7 | 4.3 (43)<br>1.7 | 4.7 (103)<br>1.7 |
| Domain | 6.3 (62)<br>1.4 | 5.5 (53)<br>1.5 | 5.9 (115)<br>1.5 |

*Scale values were reversed for negatively-stated items.

Rating Scale

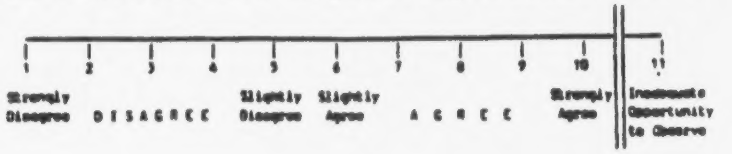
1
2
3
4
5
6
7
8
9
10
11
Strongly Disagree
DISAGREE
Slightly Disagree
Slightly Agree
AGREE
Strongly Agree
Inadequate Opportunity to Observe

*Table 3.* Image of the Research in Agricultural Education by College of Agriculture and Education Administrators

| Statement rated | Type of Administrators (x̄/S.D.)<br>Agriculture Administrators (# of cases) n = 60 | Education Administrators (# of cases) n = 52 | Total (# of cases) n = 112 |
|---|---|---|---|
| 1. Research in agricultural education is disproportionately weighted toward survey methodologies.* | 4.0 (57)<br>2.0 | 4.3 (39)<br>2.4 | 4.1 (96)<br>2.2 |
| 2. Research problems investigated are significant and meaningful ones. | 5.7 (60)<br>1.9 | 5.8 (44)<br>2.3 | 5.8 (104)<br>2.1 |
| 3. Research in agricultural education leaves a lot to be desired.* | 4.8 (57)<br>2.1 | 4.6 (48)<br>2.3 | 4.7 (105)<br>2.2 |
| 4. Research in agricultural education has made significant contributions to knowledge. | 5.8 (57)<br>2.0 | 5.5 (43)<br>2.3 | 5.6 (100)<br>2.1 |
| 5. Research methods in agricultural education are rigorous. | 5.3 (56)<br>1.8 | 5.5 (44)<br>2.2 | 5.4 (100)<br>2.0 |
| 6. Quality research is a concern to agricultural educators. | 6.8 (57)<br>1.7 | 6.0 (49)<br>2.4 | 6.4 (106)<br>2.1 |
| 7. Research is a high priority to agricultural educators. | 4.7 (60)<br>1.9 | 5.0 (52)<br>2.6 | 4.8 (112)<br>2.3 |
| 8. Research in agricultural education attracts funding from granting agencies. | 4.6 (57)<br>2.0 | 5.2 (44)<br>2.6 | 5.8 (99)<br>2.3 |

*Table 3.* Image of the Research in Agricultural Education by College of Agriculture and Education Administrators (Continued)

| Statement rated | Type of Administrators (x̄/S.D.)<br>Agriculture Administrators (# of cases) n = 60 | Education Administrators (# of cases) n = 52 | Total (# of cases) n = 112 |
|---|---|---|---|
| 9. Interesting agricultural edcuation research attracts graduate students to the program. | 6.3 (55)<br>1.9 | 5.2 (44)<br>2.8 | 5.8 (99)<br>2.4 |
| 10. Research in agricultural education has adequate facilities and equipment. | 5.4 (55)<br>2.1 | 5.7 (44)<br>2.2 | 5.5 (99)<br>2.2 |
| Domain | 5.3 (60)<br>1.2 | 5.3 (52)<br>1.9 | 5.3 (112)<br>1.6 |

*Scale values were reversed for negatively-stated items.

Rating Scale

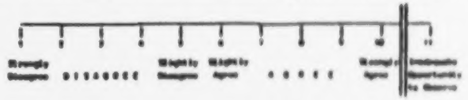

*Table 4.* Image of the Teaching in Agricultural Education by College of Agriculture and Education Administrators

| Statement rated | Agriculture Administrators (# of cases) n = 61 | Education Administrators (# of cases) n = 53 | Total (# of cases) n = 114 |
|---|---|---|---|
| | Type of Administrators ($\bar{x}$/S.D.) | | |
| 1. Courses in agricultural education have a lot of "content" to offer students. | 6.2 (59)<br>1.7 | 6.6 (51)<br>1.9 | 6.4 (110)<br>1.8 |
| 2. Courses in agricultural education have little substance to offer students.' | 6.7 (59)<br>2.0 | 6.9 (52)<br>2.0 | 6.8 (111)<br>2.0 |
| 3. Courses in agricultural education have too much form and not enough content.' | 5.8 (59)<br>2.1 | 6.5 (50)<br>2.0 | 6.2 (109)<br>2.1 |
| 4. Courses in agricultural education are academically challenging. | 5.5 (61)<br>1.6 | 5.3 (53)<br>1.6 | 5.4 (114)<br>1.6 |
| 5. Agricultural educators care too little about theory and are too concerned about "how to."' | 5.8 (59)<br>1.8 | 4.9 (51)<br>2.0 | 5.4 (110)<br>2.0 |
| 6. Agricultural educators are too conciliatory in trying to accommodate students.' | 5.7 (59)<br>1.9 | 5.0 (51)<br>2.3 | 5.3 (110)<br>2.1 |
| 7. High grades are difficult to obtain in agricultural education courses.' | 7.6 (57)<br>1.4 | 7.5 (52)<br>1.7 | 7.5 (109)<br>1.5 |
| Domain | 6.2 (61)<br>1.3 | 6.1 (53)<br>1.2 | 6.1 (114)<br>1.2 |

'Scale values were reversed for negatively-stated items.

Rating Scale

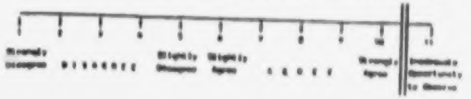

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*Table 5.* Image of the Service in Agricultural Education by College of Agriculture and Education Administrators

| Statement rated | Agriculture Administrators (# of cases) n = 62 | Education Administrators (# of cases) n = 55 | Total (# of cases) n = 117 |
|---|---|---|---|
| | Type of Administrators ($\bar{x}$/S.D.) | | |
| 1. Service to teachers, agents and other educators is a high priority in agricultural education. | 8.0 (60)<br>1.6 | 8.7 (53)<br>1.3 | 8.4 (113)<br>1.5 |
| 2. Adequate service to the university and college is provided by agricultural educators. | 7.5 (62)<br>1.6 | 7.3 (55)<br>1.7 | 7.4 (117)<br>1.7 |
| 3. Agricultural educators are more involved with civic and community groups than most faculty. | 6.4 (56)<br>2.2 | 6.7 (48)<br>2.2 | 6.5 (104)<br>2.2 |
| 4. FFA, 4-H and Young Farmer organizations utilize a lot of the time of the agricultural education faculty members. | 7.4 (60)<br>1.7 | 7.4 (50)<br>2.1 | 7.4 (110)<br>1.9 |
| 5. Agricultural educators spend more time serving their clientele (vocational agriculture teachers and county agents) than most educator groups. | 8.1 (60)<br>1.3 | 7.6 (51)<br>2.0 | 7.9 (111)<br>1.7 |
| 6. Service to professional organizations is above the average of other departments. | 6.7 (56)<br>2.0 | 6.2 (52)<br>2.2 | 6.4 (110)<br>2.1 |
| Domain | 7.3 (62)<br>1.0 | 7.3 (55)<br>1.4 | 7.3 (117)<br>1.2 |

Rating Scale

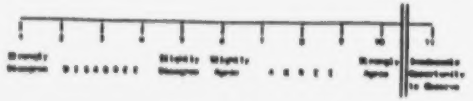

*Table 6.* Image of the General Areas of Concern in Agricultural Education by College of Agriculture and Education Administrators

| | Type of Administrators ($\bar{x}$/S.D.) | | |
|---|---|---|---|
| Statement rated | Agriculture Administrators (# of cases) n = 62 | Education Administrators (# of cases) n = 55 | Total (# of cases) n = 117 |
| 1. Facilities for agricultural education are nicely maintained and attractive. | 6.8 (62)<br>1.6 | 7.1 (55)<br>1.5 | 7.0 (117)<br>1.6 |
| 2. Our agricultural education program is highly respected nationally. | 6.4 (59)<br>2.2 | 6.4 (50)<br>2.6 | 6.4 (109)<br>2.4 |
| 3. Faculty in agricultural education expect courses their students take in other departments to be "watered-down" until there is little substance to them.* | 8.0 (59)<br>2.0 | 7.6 (51)<br>1.8 | 7.8 (110)<br>1.9 |
| 4. Administrators of agricultural education programs are not as effective as those in other areas.* | 7.7 (60)<br>2.4 | 7.7 (51)<br>2.3 | 7.7 (111)<br>2.3 |
| 5. Agricultural education has less public support than most programs in the college.* | 6.2 (58)<br>2.0 | 6.5 (53)<br>2.7 | 6.3 (111)<br>2.4 |
| 6. Agricultural educators are active politically. | 5.4 (56)<br>2.0 | 6.3 (46)<br>2.2 | 5.8 (102)<br>2.1 |
| 7. Facilities for research and teaching are up to date. | 5.9 (62)<br>1.7 | 6.3 (53)<br>2.1 | 6.1 (115)<br>1.9 |

*Table 6.* Image of the General Areas of Concern in Agricultural Education by College of Agriculture and Education Administrators (Continued)

| | Type of Administrators ($\bar{x}$/S.D.) | | |
|---|---|---|---|
| Statement rated | Agriculture Administrators (# of cases) n = 62 | Education Administrators (# of cases) n = 55 | Total (# of cases) n = 117 |
| 8. Our agricultural education program is highly respected on campus. | 6.1 (62)<br>2.0 | 5.6 (55)<br>2.4 | 5.9 (117)<br>2.2 |
| Domain | 6.6 (62)<br>1.2 | 6.7 (55)<br>1.4 | 6.6 (117)<br>1.3 |

*Scale values were reversed for negatively-stated items.

Rating Scale

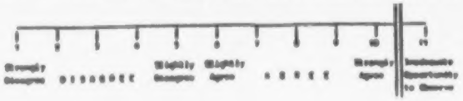

*Table 7.* Image of Agricultural Education by College Affiliation

| | College Affiliation ($\bar{x}$/S.D.) | | | |
|---|---|---|---|---|
| Domain | Agriculture (# of cases) n = 62 | Education (# of cases) n = 55 | Total (# of cases) n = 117 | F-Value |
| 1. Faculty | 7.5 (62)<br>1.1 | 7.1 (55)<br>1.2 | 7.3 (117)<br>1.2 | 3.28* |
| 2. Students | 6.3 (62)<br>1.4 | 5.5 (53)<br>1.5 | 5.9 (115)<br>1.5 | 8.70* |
| 3. Research | 5.3 (60)<br>1.2 | 5.3 (52)<br>1.9 | 5.3 (112)<br>1.6 | .00 |
| 4. Teaching | 6.2 (61)<br>1.3 | 6.1 (53)<br>1.2 | 6.1 (114)<br>1.2 | .10 |
| 5. Service | 7.3 (62)<br>1.0 | 7.3 (55)<br>1.4 | 7.3 (117)<br>1.2 | .00 |
| 6. General | 6.6 (62)<br>1.2 | 6.7 (55)<br>1.4 | 6.6 (117)<br>1.3 | .31 |

* p<.10

*Table 8.* Image of Faculty by College Affiliation

| | College | |
|---|---|---|
| | Agriculture | Education |
| n | 62 | 55 |
| Mean | 7.5 | 7.1 |
| Standard Deviation | 1.1 | 1.2 |

| Source | D.F. | Sum of Squares | Mean Squares | F |
|---|---|---|---|---|
| Between | 1 | 4.8 | 4.8 | 3.28* |
| Within | 115 | 170.4 | 1.4 | |
| Total | 116 | 175.2 | | |

* p<.10

*Table 9.* Image of Students in Agricultural Education by College Affiliation

| | College | |
|---|---|---|
| | Agriculture | Education |
| n | 62 | 53 |
| Mean | 6.3 | 5.5 |
| Standard Deviation | 1.4 | 1.5 |

| Source | D.F. | Sum of Squares | Mean Squares | F |
|---|---|---|---|---|
| Between | 1 | 20.1 | 20.1 | 8.70* |
| Within | 113 | 261.5 | 2.3 | |
| Total | 114 | 281.6 | | |

* p<.10

Table 10. Image of Agricultural Education by American Association of Teacher Educators in Agriculture (A.A.T.E.A.) Region

| Domain | A.A.T.E.A. Region (x̄/S.D.)<br>East<br>(# of cases)<br>n = 18 | Central<br>(# of cases)<br>n = 28 | South<br>(# of cases)<br>n = 51 | West<br>(# of cases)<br>n = 20 | Total<br>(# of cases)<br>n = 117 | F-Value |
|---|---|---|---|---|---|---|
| 1. Faculty | 7.5 (18)<br>1.0 | 7.3 (28)<br>1.0 | 7.3 (51)<br>1.2 | 7.2 (20)<br>1.5 | 7.3 (117)<br>1.2 | .15 |
| 2. Students | 6.2 (17)<br>1.4 | 5.6 (28)<br>1.5 | 6.1 (51)<br>1.3 | 5.8 (19)<br>2.1 | 5.9 (115)<br>1.5 | .78 |
| 3. Research | 4.8 (17)<br>1.3 | 4.9 (27)<br>1.4 | 6.0 (49)<br>1.3 | 4.7 (19)<br>1.9 | 5.3 (112)<br>1.6 | 5.71* |
| 4. Teaching | 6.0 (18)<br>1.1 | 5.7 (28)<br>1.3 | 6.3 (50)<br>1.1 | 6.3 (18)<br>1.5 | 6.1 (114)<br>1.2 | 1.76 |
| 5. Service | 7.1 (18)<br>1.3 | 7.0 (28)<br>1.1 | 7.2 (51)<br>1.0 | 7.1 (20)<br>1.4 | 7.3 (117)<br>1.2 | 2.88 |
| 6. General | 6.0 (18)<br>1.4 | 6.6 (28)<br>1.3 | 6.9 (51)<br>1.2 | 6.5 (20)<br>1.3 | 6.6 (117)<br>1.3 | 1.88 |

* p<.10

Table 11. Image of Research by American Association of Teacher Educators in Agriculture (A.A.T.E.A.) Region

| | Region<br>East | Central | South | West |
|---|---|---|---|---|
| n | 17 | 27 | 49 | 19 |
| Mean | S4.8 | 4.9 | 6.0 | 4.7 |
| | | S___ | ___ | |
| | | | S___ | ___ |
| Standard Deviation | 1.3 | 1.4 | 1.3 | 1.9 |

| Source | D.F. | Sum of Squares | Mean Squares | F |
|---|---|---|---|---|
| Between | 3 | 39.3 | 13.1 | 5.71* |
| Within | 108 | 248.1 | 2.2 | |
| Total | 111 | 287.4 | | |

* p<.10

S ___ ___ Parallel lines indicated statistically significant difference between groups of professionals using the Tukey method.

*Table 12.* Image of Agricultural Education Among College of Education Administrators by American Association of Teacher Educators in Agriculture (A.A.T.E.A.) Region

| Domain | A.A.T.E.A. Region ($\bar{x}$/S.D.)<br>East<br>(# of cases)<br>n = 7 | Central<br>(# of cases)<br>n = 12 | South<br>(# of cases)<br>n = 25 | West<br>(# of cases)<br>n = 11 | Total<br>(# of cases)<br>n = 55 | F-Value |
|---|---|---|---|---|---|---|
| 1. Faculty | 7.5 (7)<br>.4 | 7.1 (12)<br>1.1 | 7.3 (25)<br>1.2 | 6.5 (11)<br>1.7 | 7.1 (55)<br>1.2 | 1.32 |
| 2. Students | 6.1 (6)<br>.8 | 5.0 (12)<br>1.0 | 5.9 (25)<br>1.3 | 4.7 (10)<br>2.4 | 5.5 (53)<br>1.5 | 2.20 |
| 3. Research | 4.7 (6)<br>1.4 | 5.0 (12)<br>1.7 | 6.1 (24)<br>1.6 | 4.1 (10)<br>2.4 | 5.3 (52)<br>1.9 | 3.27* |
| 4. Teaching | 6.2 (7)<br>.5 | 5.9 (12)<br>1.4 | 6.2 (24)<br>1.1 | 5.9 (10)<br>1.5 | 6.1 (53)<br>1.2 | .28 |
| 5. Service | 6.8 (7)<br>1.5 | 7.0 (12)<br>1.3 | 7.9 (25)<br>1.1 | 6.9 (11)<br>1.7 | 7.3 (55)<br>1.4 | 2.22 |
| 6. General | 6.8 (7)<br>1.5 | 7.0 (12)<br>1.5 | 6.8 (25)<br>1.3 | 6.1 (11)<br>1.4 | 6.7 (55)<br>1.4 | .95 |

* p<.10

*Table 13.* Image of Research in Colleges of Education by American Association of Teacher Educators in Agriculture (A.A.T.E.A.) Region

|  | Region<br>East | Central | South | West |
|---|---|---|---|---|
| n | 6 | 12 | 24 | 10 |
| Mean | 4.7 | 5.0 | S6.1 | 4.1 |
| Standard Deviation | 1.4 | 1.7 | 1.6 | 2.4 |

| Source | D.F. | Sum of Squares | Mean Squares | F |
|---|---|---|---|---|
| Between | 3 | 32.6 | 10.8 | 3.27* |
| Within | 48 | 159.2 | 3.3 |  |
| Total | 51 | 192.2 |  |  |

* p<.10

S ___ ___ Parallel lines indicated statistically significant difference between groups of professionals using the Tukey method.

*Table 14.* Image of Agricultural Education Among College of Agriculture Administrators by American Association of Teacher Educators in Agriculture (A.A.T.E.A.) Region

| Domain | A.A.T.E.A. Region ($\bar{x}$/S.D.)<br>East<br>(# of cases)<br>n = 11 | Central<br>(# of cases)<br>n = 16 | South<br>(# of cases)<br>n = 26 | West<br>(# of cases)<br>n = 9 | Total<br>(# of cases)<br>n = 62 | F-Value |
|---|---|---|---|---|---|---|
| 1. Faculty | 7.5 (11)<br>1.3 | 7.4 (16)<br>.9 | 7.4 (26)<br>1.2 | 8.1 (9)<br>.7 | 7.5 (62)<br>1.1 | .87 |
| 2. Students | 6.2 (11)<br>1.7 | 6.1 (16)<br>1.6 | 6.3 (26)<br>1.3 | 7.0 (9)<br>.6 | 6.3 (60)<br>1.4 | .78 |
| 3. Research | 4.9 (11)<br>1.4 | 4.8 (15)<br>1.2 | 5.9 (25)<br>1.0 | 5.3 (9)<br>1.1 | 5.3 (61)<br>1.2 | 3.25* |
| 4. Teaching | 5.9 (11)<br>1.3 | 5.5 (16)<br>1.3 | 6.4 (26)<br>1.1 | 6.8 (8)<br>1.3 | 6.2 (61)<br>1.3 | 2.49 |
| 5. Service | 7.2 (11)<br>1.2 | 7.0 (16)<br>1.0 | 7.6 (26)<br>.9 | 7.4 (9)<br>.8 | 7.3 (62)<br>1.0 | .96 |
| 6. General | 5.5 (11)<br>1.1 | 6.3 (16)<br>1.2 | 6.9 (26)<br>1.1 | 7.1 (9)<br>1.0 | 6.6 (62)<br>1.2 | 4.64* |

* $p<.10$

*Table 15.* Image of Research in Colleges of Agriculture by American Association of Teacher Educators in Agriculture (A.A.T.E.A.) Region

| | Region | | | |
|---|---|---|---|---|
| | East | Central | South | West |
| n | 11 | 15 | 25 | 9 |
| Mean | 4.9 | S4.8 | 5.9 | 5.3 |
| Standard Deviation | 1.4 | 1.2 | 1.0 | 1.1 |

| Source | D.F. | Sum of Squares | Mean Squares | F |
|---|---|---|---|---|
| Between | 3 | 14.1 | 4.7 | 3.25* |
| Within | 56 | 81.1 | 1.4 | |
| Total | 59 | 95.2 | | |

* p<.10

S ___ ___ Parallel lines indicated statistically significant difference between groups of professionals using the Tukey method.

*Table 16.* Image of the General Areas of Concern in Colleges of Agriculture by American Association of Teacher Educators in Agriculture (A.A.T.E.A.) Region

| | Region | | | |
|---|---|---|---|---|
| | East | Central | South | West |
| n | 11 | 16 | 26 | 9 |
| Mean | S5.5 | 6.3 | 6.9 | 7.1 |
| | S___ | | | ___ |
| Standard Deviation | 1.1 | 1.2 | 1.1 | 1.0 |

| Source | D.F. | Sum of Squares | Mean Squares | F |
|---|---|---|---|---|
| Between | 3 | 19.2 | 6.4 | 4.64* |
| Within | 58 | 78.8 | 1.3 | |
| Total | 61 | 99.0 | | |

* p<.10

S ___ ___ Parallel lines indicated statistically significant difference between groups of professionals using the Tukey method.

*Table 17.* Image of Agricultural Education by Type of Institution

| Domain | Type of Institution ($\bar{x}$/S.D.) | | | | |
|---|---|---|---|---|---|
| | 1862 Land-grant (# of cases) n = 76 | 1890 Land-grant (# of cases) n = 10 | Non-Land-grant (# of cases) n = 31 | Total (# of cases) n = 117 | F-Value |
| 1. Faculty | 7.4 (76)<br>1.2 | 7.3 (10)<br>1.5 | 7.2 (31)<br>1.1 | 7.3 (117)<br>1.2 | .11 |
| 2. Students | 5.8 (74)<br>1.6 | 6.3 (10)<br>1.6 | 6.1 (31)<br>1.4 | 5.9 (115)<br>1.5 | .53 |
| 3. Research | 5.1 (74)<br>1.6 | 5.5 (10)<br>1.6 | 5.7 28)<br>1.4 | 5.3 (112)<br>1.6 | 1.41 |
| 4. Teaching | 6.1 (74)<br>1.3 | 6.2 (9)<br>1.6 | 6.2 (31)<br>1.1 | 6.1 (114)<br>1.2 | .06 |
| 5. Service | 7.3 (76)<br>1.2 | 7.2 (10)<br>1.4 | 7.5 (31)<br>1.1 | 7.3 (117)<br>1.2 | .57 |
| 6. General | 6.5 (76)<br>1.3 | 6.5 (10)<br>1.4 | 7.0 (31)<br>1.2 | 6.6 (117)<br>1.3 | 1.96 |

Table 18. Characteristics of the Respondents (n = 118)

| | f | % |
|---|---|---|
| 1. Gender | | |
| Male | 111 | 94.1 |
| Female | 7 | 5.9 |
| 2. Academic Rank | | |
| Full Professor | 104 | 88.1 |
| Associate Professor | 9 | 7.6 |
| Assistant Professor | 1 | 0.9 |
| Missing Data | 4 | 3.4 |
| 3. Experience as Administrator | | |
| Years | | |
| 0- 6 | 51 | 43.2 |
| 7-12 | 29 | 24.5 |
| 13-18 | 21 | 18.0 |
| 19-24 | 12 | 10.1 |
| 25-30 | 2 | 1.7 |
| 31-36 | 1 | 0.8 |
| Missing Data | 2 | 1.7 |
| 4. Experience as Teacher of Agriculture or Education in College or University | | |
| 0- 7 | 11 | 9.3 |
| 8-15 | 29 | 24.6 |
| 16-23 | 42 | 35.6 |
| 24-31 | 23 | 19.5 |
| 32-40 | 7 | 5.9 |
| Missing Data | 6 | 5.1 |
| 5. Teaching Experience in a Secondary School | | |
| Language Arts/English | 9 | 7.6 |
| Social Studies | 6 | 5.1 |
| Biological Sciences | 6 | 5.1 |
| Mathematics/Physics | 9 | 7.6 |
| Health and Physical Education | 1 | 0.8 |
| Vocational Agriculture | 13 | 11.1 |
| Business Education | 2 | 1.7 |
| Home Economics | 1 | 0.8 |
| Industrial Arts | 2 | 1.7 |
| Special Education | 1 | 0.8 |
| Missing Data | 3 | 2.6 |
| Did Not Teach | 65 | 55.1 |

Table 18. Characteristics of the Respondents, Continued

| | f | % |
|---|---|---|
| 6. Farm Experience | | |
| Had Farm Experience | 91 | 77.1 |
| No Farm Experience | 24 | 20.3 |
| Missing Data | 3 | 2.6 |
| 7. Major in B.S. Degree | | |
| Humanities | 24 | 20.3 |
| Biological Sciences | 7 | 5.9 |
| Physical Sciences | 15 | 12.7 |
| Health and Physical Education | 5 | 4.2 |
| Agricultural Education | 11 | 9.3 |
| Home Economics | 2 | 1.7 |
| Industrial Education/Arts/Trade | 4 | 3.4 |
| Distributive Education | 2 | 1.7 |
| Education/Psychology | 6 | 5.1 |
| Technical Sciences | 41 | 34.7 |
| Missing Data | 1 | .8 |
| 8. Enrollment in Vocational Agriculture | | |
| Did Enroll | 43 | 36.4 |
| Did Not Enroll | 74 | 62.7 |
| Missing Data | 1 | 0.9 |
| 9. Location of Agricultural Education Department | | |
| Agriculture | 62 | 52.5 |
| Education | 55 | 46.6 |
| Missing Data | 1 | 0.9 |
| 10. Direct Contact with Agricultural Education Program | | |
| Frequency | | |
| 1- 2 | 6 | 5.1 |
| 3- 4 | 11 | 9.3 |
| 5- 6 | 20 | 16.9 |
| 7- 8 | 33 | 28.0 |
| 9-10 | 47 | 39.8 |
| Missing Data | 1 | 0.9 |

*Table 19.* Relationship Between Psycho-Social Characteristics of Administrators and Image of Agricultural Education

| Psycho-Social Characteristics | Image of | | | | | |
|---|---|---|---|---|---|---|
| | Faculty | Students | Research | Teaching | Service | General |
| 1. Gender[a] | .13 | .06 | .10 | .12 | -.12 | .16 |
| 2. Academic Rank[b] | -.01 | .09 | .01 | .01 | .12 | -.07 |
| 3. Experience as Administrator[c] | .02 | .05 | .00 | .04 | .04 | .13 |
| 4. Experience as Teacher[c] | -.07 | -.02 | -.03 | -.07 | -.01 | -.04 |
| 5. Teaching Experience in Secondary School[a] | .10 | .11 | .04 | .04 | .17 | .26 |
| 6. Farm Experience/Employment in Agriculture[a] | .07 | .21 | .01 | .01 | -.02 | .07 |
| 7. Major in B.S. Degree[a] | .00 | .20 | -.10 | .07 | -.04 | -.09 |
| 8. Enrollment in Vocational Agriculture[a] | .02 | .19 | .00 | .07 | .04 | .13 |
| 9. Location of Agricultural Education Department[a] | -.18 | -.24 | -.08 | -.36 | .00 | -.13 |
| 10. Contact with Agricultural Education Program[c] | .34 | .38 | .20 | .19 | .27 | .32 |

a=Point Biserial Correlation

coding: male =1, female =2

subjects taught: Lang. Arts =1, Soc. St. =2, Bio. Sc. =3, Mat./Phy. =4, Health & Phy. Ed. =5
Voc. Ag. =6, Bus. Ed. =7, Hom. Ec. =8, Ind. Arts =9, Sp. Ed. =10, Missing = 11, did not teach =0

no farm experience =1, have farm experience =2

major in B.S. degree: Hum. =1, Bio. Sc. =2, Phy. Sc. =3, Health & Phy. Ed. =4, Ag. Ed. =5, Hom. Ec. =6
Ind. Ed. = 7, Dist. Ed. =8, Ed./Psyc. =9, Tech. Sc. =10, Missing =11

did not enroll in voc. ag. in high school =1, enrolled =2

location of Ag. Ed.: Ag. =1, Ed. =2

b=Spearman Rank Correlation

c=Pearson Correlation

coding: Full Prof. =1, Asso. Prof. =2, Asst. Prof. =3, Other =4

# PERCEPTIONS OF SCHOOL ADMINISTRATORS TOWARD VOCATIONAL AGRICULTURAL PROGRAMS

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## INTRODUCTION

Agricultural Education has undergone a tremendous change in North Carolina during the past decade. This change has resulted in a quantitative decline of programs, teachers, and students. This reduction has been due in part to factors such as integration, consolidation, industrialization, a wider variety of vocational education offerings, better job opportunities for agricultural education teachers, the concept of local autonomy, and the spreading national movement for excellence in education which limits the number of vocational credits many students may complete. While each factor has had its toll, studies by Webb (1959), Shinn (1976), Kimmons (1977), Clary (1977), Jewell (1979), and Jewell (1980) indicated that administrative support for vocational agriculture was still very positive.

In order to influence the changes occurring in education, emphasis needs to be placed on analyzing those factors which could have a negative effect on vocational agriculture and developing strategies for overcoming or improving situations which could be detrimental to vocational agriculture programs. Knowing that the concept of local autonomy allows local administrators to greatly influence their local educational programs, a need exists to collect data that portrays their perceptions toward their vocational agriculture programs.

## OBJECTIVES OF THE STUDY

The study was designed to determine if significant differences existed in attitudes of the local school administrators or if trends were occurring in perceptions of school administrators toward vocational agriculture programs that would warrant reconsideration of the organizational structure of programs and/or teacher preparation in vocational education. More specifically, the research objectives were as follows:

1. To examine the opinions of local superintendents, principals, and vocational education directors toward selected aspects of vocational agriculture programs in North Carolina.
2. To determine if significant differences exist in the opinions of different types of administrators toward local vocational agriculture programs in North Carolina.
3. To compare the perceptions of 1985-86 school administrators with those of a similar study which was conducted during the 1978-79 academic year to determine if there has been a significant change in the opinions of the administrators during the seven year time period.

## METHODS AND PROCEDURES

This study was designed to replicate a similar study which was done in North Carolina (Jewell, 1980) during the 1978-79 academic year. The population for this study consisted of all North Carolina public secondary school superintendents, vocational directors and principals during the 1985/86 academic year which had vocational agriculture as a part of their curricula.

The 1985-86 North Carolina Vocational Agriculture Directory was used to identify the the local education agencies which had vocational agriculture as a part of their curricula and served as the frame for the study. The research sample was randomly selected and consisted of 50 superintendents, 50 vocational directors, and 100 principals. The study sample was in excess of 33% of the population for each type of administrator.

A confidential 45-item survey instrument was used to collect the research data for both the 78-79 and 85-86 studies. It was a slightly modified version of an instrument originally designed and used by Webb (1959) and used in studies by Shinn(1976) and Kimmons (1977). Content validity of the instrument was assumed based on the acceptance of the instrument by professional educators.

Similar techiques were used for data collection for each of the studies. The instruments were mailed during the Fall semester of each school year with a cover letter and self-addressed return envelope. Non-respondents were sent a follow-up letter three weeks after the initial mailing. A second follow-up letter was sent to non-respondents three weeks after the first follow-up mailing. In 1978/79, 80% of the instruments were returned, including a 77% return from principals, an 82% return from vocational directors, and an 84% return from the superintendents. This compared to an overall return of 61.5% in 1985/86, made up of a 52% return by principals, an 86% return by vocational directors and a 56% return by superintendents. Based on a statistical comparison of the data, it was found that there was no significant difference in the data received from late respondents and that received from the initial respondents. Therefore,the data from initial and late respondents were combined for analysis. The data were analyzed using chi square statistics.

## RESULTS

Administrators are in a position to determine to a large extent the purpose of instruction in the vocational agriculture program. There were significant differences in the opinions among the three groups of administrators ($p=.05$) in both 1978-79, $X^2=19.94$, ($df = 8$, C.V. = 15.51) and 1985-86, $X^2 = 24.79$, ($df = 8$, C.V. =15.51) concerning the controlling purpose of vocational agriculture programs. However, no significant differences were found when comparing the

Table 1.
Opinions of 1978-79 and 1985-86 School Administrators Concerning the Controlling Purpose of Vocational Agriculture Programs

| | Principals | | Superintendents | | Directors | | Combined Total | |
|---|---|---|---|---|---|---|---|---|
| | 78-79 (N=78) | 85-86 (N=52) | 78-79 (N=42) | 85-86 (N=28) | 78-79 (N=40) | 85-86 (N=43) | 78-79 (N=160) | 85-86 (N=123) |
| Controlling Purpose | % | % | % | % | % | % | % | % |
| Train for employment in farming | 7.6 | 3.9 | 14.3 | 14.3 | 2.5 | 9.3 | 8.1 | 8.1 |
| Train for employment in agricultural occupations | 56.4 | 44.2 | 66.7 | 39.3 | 87.5 | 74.5 | 66.9 | 53.7 |
| Train for employment in any occupation | 11.6 | 9.6 | 14.3 | 25.0 | 2.5 | 2.3 | 10.0 | 10.6 |
| Provide general knowledge of agriculture | 21.8 | 36.5 | 4.7 | 14.3 | 7.5 | 11.6 | 13.8 | 22.8 |
| Other | 2.6 | 5.8 | 0.0 | 7.1 | 0.0 | 2.3 | 1.2 | 4.8 |

opinions of the administrators by group for the two time periods. While the three groups differed in their opinions regarding the controlling purpose of vocational agriculture, there was no significant change in opinions of either group over the seven year time span between the two studies as to their perceptions of the controlling purpose. As reported in Table 1, the majority of all three types of administrators perceived the controlling purpose of vocational agriculture programs to be training for employment in agricultural occupations. However, the percentage of all administrators sharing this opinion decreased from 66.9% in 78-79 to 53.7% in 85-86. More principals indicated that the controlling purpose was to gain general knowledge of agriculture, 21.8% in 78-79 and 36.5% in 85-86, than either the superintendents or vocational education directors.

Approximately one third of the 85-86 school administrators in North Carolina felt a majority of the people in their communities regarded vocational agriculture as an essential part of high school education. Also, as reported in Table 2, in 1985-86 over half (55.3%) of the administrators indicated that it was their opinion that a majority of the people in their community regarded vocational agriculture as essential for persons concerned with agriculture. There were no significant differences between or among the groups (p=.05) concerning attitudes of the majority of people in their communities toward vocational agriculture.

Table 2.
Opinions of 1978-79 and 1985-86 School Administrators Concerning the Attitudes of the Community Toward Vocational Agriculture Programs

| | Principals | | Superintendents | | Directors | | Combined Total | |
|---|---|---|---|---|---|---|---|---|
| | 78-79 (N=78) | 85-86 (N=52) | 78-79 (N=42) | 85-86 (N=28) | 78-79 (N=40) | 85-86 (N=43) | 78-79 (N=160) | 85-86 (N=123) |
| Community Attitudes | % | % | % | % | % | % | % | % |
| Regard is as an essential part of education | 53.8 | 30.8 | 26.2 | 35.7 | 45.0 | 30.2 | 44.4 | 31.7 |
| Regard it as significant for persons concerned with agriculture | 38.5 | 55.8 | 54.8 | 50.0 | 42.5 | 58.2 | 43.8 | 55.3 |
| Indifferent toward program | 7.7 | 13.4 | 19.0 | 14.3 | 12.5 | 11.63 | 11.8 | 13.0 |

There were no significant differences between or among the groups (p=.05) concerning the reasons students enrolled in vocational agriculture classes. As reported in Table 3, when asked to give their opinions on the primary reasons students enroll in classes of vocational agriculture, over 80 % of the administrators indicated that they felt the students were interested in occupations related to agriculture. Also, as reported in Table 3, in 1985-86 the primary reason given by the second largest percentage of administrators for students enrolling in vocational agriculture programs was the popularity of the teacher.

While there were no significant differences (p=.05) between or among the groups of administrators in their opinions concerning why students enroll in classes of vocational agriculture, there was a difference in the importance of the items as ranked based on opinions of adminisitrators in 78-79 and 85-86. In 78-79 the priority ranking of the reasons given for students enrolling in vocational agriculture classes were, from highest to lowest: "interested in agricultural occupations," "they plan to be farmers," "popularity of teacher," "for training in agricultural mechanics," "to avoid taking other subjects," and "to become FFA members." In 85-86 the priority ranking was: "interested in agricultural occupations," " popularity of teacher," " they plan to be farmers," " to become FFA members," " to avoid other subjects," and "for training in agricultural mechanics."

Table 3.
Opinions of 1978-79 and 1985-86 School Administrators Concerning the Primary Reasons Students Enroll in Classes of Vocational Agriculture

| | Principals | | Superintendents | | Directors | | Combined Total | |
|---|---|---|---|---|---|---|---|---|
| | 78-79 (N=78) | 85-86 (N=52) | 78-79 (N=42) | 85-86 (N=28) | 78-79 (N=40) | 85-86 (N=43) | 78-79 (N=160) | 85-86 (N=123) |
| Reasons for enrolling | % | % | % | % | % | % | % | % |
| Plan to be farmers | 50.0 | 44.2 | 52.4 | 42.9 | 55.0 | 51.2 | 51.9 | 46.3 |
| Interested in occupations related to agriculture | 88.5 | 80.8 | 76.2 | 71.4 | 85.0 | 88.4 | 84.4 | 81.3 |
| Popularity of teacher | 33.3 | 34.6 | 40.5 | 46.4 | 42.5 | 72.1 | 37.5 | 50.4 |
| To become members of FFA | 29.5 | 32.7 | 23.8 | 32.1 | 32.5 | 46.5 | 28.8 | 37.4 |
| To take agricultural mechanics | 38.5 | 30.8 | 38.1 | 42.9 | 35.0 | 27.9 | 37.5 | 32.5 |
| To avoid taking other subjects | 32.1 | 32.7 | 33.3 | 42.9 | 30.0 | 32.6 | 31.9 | 35.0 |

Note: Respondents were allowed to select more than one reason.

As reported in Table 4, during both the 78-79 and 85-86 school years, 75% or more of each group of administrators indicated that they believed that students received an adequate high school education when enrolling in four years of vocational agriculture. Even though there were no significant differences (p = .05)between or among the groups, and the percentages were small, fewer administrators in 85-86, (6.5%), indicated that they did not feel students received an adequate high school education when enrolling in four years of vocational agriculture than did in 78-79, (8.1%).

Table 5 reflects the opinions of school administrators regarding the percentage of students graduating from high school with four units of vocational agriculture that should enter farming upon graduation in order to justify the program. A significant difference (p=.05) was found between the different groups of administrators during the 78-79 school year, $X^2 = 22.33$, (dF = 12, C.V.= 21.03). However, a significant difference was not found at the p=.05 level when

Table 4.
Opinions of 1978-79 and 1985-86 School Administrators Concerning Their Perceptions of Whether or Not Students Who Enroll in Vocational Agriculture for Four Years Receive an Adequate High School Education

| | Principals | | Superintendents | | Directors | | Combined Total | |
|---|---|---|---|---|---|---|---|---|
| Responses | 78-79 (N=78) % | 85-86 (N=52) % | 78-79 (N=42) % | 85-86 (N=28) % | 78-79 (N=40) % | 85-86 (N=43) % | 78-79 (N=160) % | 85-86 (N=123) % |
| Yes | 91.0 | 84.6 | 76.2 | 75.0 | 85.0 | 88.4 | 85.6 | 83.7 |
| No | 5.1 | 5.8 | 11.9 | 7.1 | 10.0 | 7.0 | 8.1 | 6.5 |
| Undecided | 2.6 | 7.7 | 9.5 | 10.8 | 2.5 | 2.3 | 4.4 | 6.5 |
| Other | 1.3 | 1.9 | 2.4 | 7.1 | 2.5 | 2.3 | 1.9 | 3.3 |

comparing the reponses by group for the two years nor when comparing the responses among the three groups of administrators in the 85-86 school year. Based on their responses, in 78-79 the principals were less concerned about the percentage of students entering farming than were the superintendents or vocational education directors. When grouping their responses, nearly half (48.7%) of the principals in 78-79 indicated the percent of students entering farming was unimportant, or that less than 10% needed to enter farming to justify the vocational agriculture program. Only 20% of the vocational education directors and 38% of the superintendents shared this opinion. In 85-86 the "percent unimportant" choice was the category selected by the largest percentage of all three types of administrators.

Table 5.
Opinions of 1978-79 and 1985-86 School Administrators Regarding the Percentage of Students That Should Enter Farming Upon Graduation From High School in Order to Justify the Vocational Agriculture Program

| | Principals | | Superintendents | | Directors | | Combined Total | |
|---|---|---|---|---|---|---|---|---|
| Percentage Needed | 78-79 (N=78) % | 85-86 (N=52) % | 78-79 (N=42) % | 85-86 (N=28) % | 78-79 (N=40) % | 85-86 (N=43) % | 78-79 (N=160) % | 85-86 (N=123) % |
| Less than 10 | 17.9 | 19.2 | 9.5 | 17.9 | 7.5 | 7.0 | 13.1 | 14.6 |
| 10 - 24 | 28.2 | 11.5 | 16.7 | 17.9 | 25.0 | 30.2 | 24.4 | 19.5 |
| 25 - 49 | 14.1 | 7.7 | 21.4 | 7.1 | 27.5 | 18.6 | 19.4 | 11.4 |
| 50 - 74 | 7.7 | 3.9 | 9.5 | 10.7 | 20.0 | 7.0 | 11.2 | 6.5 |
| 75 and over | 0.0 | 3.9 | 9.5 | 7.1 | 5.0 | 4.7 | 3.8 | 4.9 |
| Percent unimportant | 30.8 | 51.9 | 28.6 | 32.2 | 12.5 | 32.5 | 25.6 | 40.7 |
| Other | 1.3 | 1.9 | 4.8 | 7.1 | 2.5 | 0.0 | 2.5 | 2.4 |

When examining administrator opinions about the portion of students with four units of vocational agriculture who should enter an agricultural related occupation upon graduation from high school, significant differences were found. Significant differences ($p=.05$) were found among the groups for both 78-79, $X^2 = 35.07$ (df = 12, C.V. = 21.03), and 85-86, $X^2 = 27.12$ (df=12, C.V.= 21.03). Significant differences (p=.05) were also found when comparing the responses of the principals between the two years, $X^2 = 16.44$ (df = 6, C. V. = 12.59). When observing the combined responses in Table 6 for the two years, it can be seen that approximately 66% of the of the administrators in 85-86, as compared to approximately 49% in 78-79, perceived that the number of students needing to enter an agricultural related occupation was unimportant or that less than 24% of the students with four units of vocational agriculture was needed to enter an agricultural related occupation in order to justify vocational agriculture programs. To justify the programs, approximately 50% of the administrators in 78-79 indicated that more than 24% of the program graduates needed to enter an agricultural related occupation. In 85-86 the percentage of administrators with the same expectations decreased to approximately 34%. These changes indicated that administrators in 85-86 were not as concerned about the accountability of the programs as measured by the number of students entering agricultural related occupations as were the administrators in 78-79.

Table 6.

Opinions of 1978-79 and 1985-86 School Administrators Regarding the Percentage of Students That Should Enter an Agricultural Related Occupation Upon Graduation From High School in Order to Justify the Vocational Agriculture Program

| | Principals | | Superintendents | | Directors | | Combined Total | |
|---|---|---|---|---|---|---|---|---|
| | 78-79 (N=78) | 85-86 (N=52) | 78-79 (N=42) | 85-86 (N=28) | 78-79 (N=40) | 85-86 (N=43) | 78-79 (N=160) | 85-86 (N=123) |
| Percentage Needed | % | % | % | % | % | % | % | % |
| Less than 10 | 6.4 | 9.6 | 7.1 | 7.1 | 7.5 | 4.7 | 6.9 | 7.3 |
| 10 - 24 | 26.9 | 28.9 | 12.5 | 14.3 | 15.0 | 25.6 | 20.0 | 24.4 |
| 25 - 49 | 19.2 | 7.7 | 30.9 | 10.7 | 30.0 | 18.6 | 25.0 | 12.2 |
| 50 - 74 | 15.4 | 1.9 | 9.0 | 28.6 | 35.0 | 25.6 | 18.8 | 16.3 |
| 75 and over | 0.0 | 1.9 | 16.7 | 14.3 | 7.5 | 7.1 | 6.2 | 5.7 |
| Percent unimportant | 30.8 | 44.2 | 21.4 | 14.3 | 5.0 | 13.9 | 21.9 | 28.4 |
| Other | 1.3 | 3.9 | 2.4 | 10.7 | 0.0 | 4.6 | 1.2 | 5.7 |

As reported in Table 7, the majority of the combined administrators, 55.6% in 78-79 and 63.4% in 85-86, perceived that vocational agriculture programs offer the necessary basic occupational preparation needed for youth to go immediately into farming after graduating from high school. The majority of the administrators , 53.8% in 78-79 and 62.6% in 85-86, also feel that their vocational agriculture programs offer the necessary basic occupational prepartation needed for the students to go immediately into agriculturally related occupations after graduation from high school. While there were no significant differences (p=.05) between or among the groups regarding opinions of the administrators toward the necessary basic occupational preparation being provided the vocational agriculture students, there was aslightly higherpercentage of administrators in 85-86 who felt the programs were providing the necessary preparation needed for entering, both, farming and agricultural related occupations than there was in 78-79. However, 28.5% of the superintendents in 85-86 compared to only 14.3 % 78-79 indicated that they did not believe that their vocational agriculture programs were providing the necessary basic occupational preparation the students needed to go immediately into farming after graduation from high school.

Table 7.

Opinions of 1978-79 and 1985-86 School Administrators Regarding Their Perceptions Whether Vocational Agriculture Programs are Providing the Necessary Basic Occupational Preparation Needed for Students to go Immediately into Farming or Agriculturally Related Occupations Upon Graduation From High School

| | Principals | | Superintendents | | Directors | | Combined Total | |
|---|---|---|---|---|---|---|---|---|
| | 78-79 (N=78) | 85-86 (N=52) | 78-79 (N=42) | 85-86 (N=28) | 78-79 (N=40) | 85-86 (N=43) | 78-79 (N=160) | 85-86 (N=123) |
| Responses | % | % | % | % | % | % | % | % |
| Farming: | | | | | | | | |
| Yes | 55.1 | 57.7 | 57.1 | 64.3 | 55.0 | 69.8 | 55.6 | 63.4 |
| No | 24.4 | 28.8 | 14.3 | 28.5 | 10.0 | 9.3 | 18.1 | 22.0 |
| Undecided | 17.9 | 13.5 | 23.8 | 3.6 | 27.5 | 18.6 | 21.9 | 13.0 |
| Other | 2.6 | 0.0 | 4.8 | 3.6 | 7.5 | 2.3 | 4.4 | 1.6 |
| Agriculturally Related: | | | | | | | | |
| Yes | 47.4 | 55.8 | 59.5 | 64.3 | 60.0 | 69.8 | 53.8 | 62.6 |
| No | 28.2 | 23.1 | 14.3 | 17.8 | 15.0 | 9.3 | 21.2 | 17.1 |
| Undecided | 20.5 | 17.3 | 23.8 | 14.3 | 22.5 | 18.6 | 21.9 | 17.1 |
| Other | 3.8 | 3.8 | 2.4 | 3.6 | 2.5 | 2.3 | 3.1 | 3.2 |

There were no significant differences (p=.05) between or among the groups of administrators regarding their opinions toward the personal qualities of the teachers of vocational agriculture which needed to be improved. As reported in Table 8, "professional improvement"

Table 8.

Opinions of 1978-79 and 1985-86 School Administrators Regarding the Personal Qualities of Teachers of Vocational Agriculture Which Need to be Improved

| | Principals | | Superintendents | | Directors | | Combined Total | |
|---|---|---|---|---|---|---|---|---|
| | 78-79 (N=78) | 85-86 (N=52) | 78-79 (N=42) | 85-86 (N=28) | 78-79 (N=40) | 85-86 (N=43) | 78-79 (N=160) | 85-86 (N=123) |
| Personal Qualities | % | % | % | % | % | % | % | % |
| Cooperation with administration | 17.9 | 23.1 | 28.6 | 28.6 | 42.5 | 41.9 | 26.9 | 30.9 |
| Cooperation with other faculty members | 29.5 | 25.0 | 19.0 | 35.7 | 27.5 | 30.2 | 26.3 | 29.3 |
| Cooperation with students | 10.3 | 9.6 | 14.3 | 10.7 | 10.0 | 9.3 | 11.3 | 9.8 |
| Cooperation with people in community | 25.6 | 19.2 | 26.2 | 17.9 | 15.0 | 18.6 | 23.1 | 18.7 |
| Cooperation with other agricultural agencies | 24.4 | 17.3 | 9.5 | 17.9 | 20.0 | 14.0 | 19.4 | 8.1 |
| Grooming in school | 12.8 | 17.3 | 16.7 | 39.3 | 22.5 | 37.21 | 16.3 | 29.3 |
| Professional improvement | 30.8 | 40.4 | 26.2 | 53.6 | 35.0 | 48.8 | 30.6 | 46.3 |
| Improvements not needed | 23.1 | 26.9 | 19.0 | 7.1 | 17.5 | 18.6 | 20.6 | 19.5 |

Note: Respondents were allowed to identify more than one quality.

was the quality that all three groups of administrators indicated as being the personal quality of their vocational agriculture teachers that needed the most improvement. When observing the combined totals, it can be seen that while 30.6% of the administrators in 78-79 cited professional improvement as the personal quality of their teachers that needed the most improvement, even a larger percentage, 46.3%, cited the same quality in 85-86. In addition, a larger percentage of administrators in 85-86 than did in 78-79 cited "cooperation with administration," "cooperation with other faculty members," "and "grooming while in school" as being personal qualities needing to be improved. Fewer administrators in 85-86 than in 78-79 cited "cooperation with students," "cooperation with people in community," and "cooperation with other agricultural agencies" as being personal qualities which needed to be improved.

No significant differences (p = .05) were found between or among the groups of administrators regarding their perceptions of inadequate teacher qualifications. As reported in Table 9, "housekeeping of classroom and shop" was reported as the qualification of the vocational agriculture teachers most frequently cited by administrators as being inadequate. Approximately 55% of all the administrators cited housekeeping as being inadequate in 78-79 and 85-86. Though the increases were not significant, a larger percentage of administrators in 85-86 than in 78-79 cited the areas of "discipline of students," "methods of teaching," "housekeeping of classroom and shop," and "organizing young farmer and adult farmer classes" as being areas which they felt their teachers were inadequate. Fewer administrators in 85-86 than in 78-79 cited "English - oral and written," " basic sciences," "technical agriculture," and "supervision of

Table 9.
Opinions of 1978-79 and 1985-86 School Administrators Regarding the Subjects or Areas of Qualifications of Teachers of Vocational Agriculture Which Seem to be Inadequate

| | Principals | | Superintendents | | Directors | | Combined Total | |
|---|---|---|---|---|---|---|---|---|
| Qualifications | 78-79 (N=78) % | 85-86 (N=52) % | 78-79 (N=42) % | 85-86 (N=28) % | 78-79 (N=40) % | 85-86 (N=43) % | 78-79 (N=160) % | 85-86 (N=123) % |
| English - oral and written | 23.1 | 17.3 | 28.6 | 28.6 | 27.5 | 32.6 | 25.6 | 25.2 |
| Basic sciences | 3.8 | 0.0 | 7.1 | 3.6 | 5.0 | 7.0 | 5.0 | 4.1 |
| Technical agriculture | 7.7 | 0.0 | 11.9 | 7.1 | 27.5 | 14.0 | 13.8 | 7.3 |
| Agricultural mechanics | 8.9 | 0.1 | 14.3 | 0.0 | 17.5 | 16.3 | 12.5 | 8.1 |
| Discipline of students | 21.8 | 26.9 | 23.8 | 17.9 | 17.5 | 23.3 | 21.3 | 23.6 |
| Methods of teaching | 21.8 | 28.9 | 33.3 | 35.7 | 27.5 | 34.9 | 26.3 | 32.5 |
| Housekeeping of classroom and shop | 39.8 | 48.1 | 71.4 | 53.6 | 67.5 | 65.1 | 55.0 | 55.3 |
| Supervision of experience programs of students | 16.7 | 11.5 | 35.7 | 28.6 | 32.5 | 18.6 | 25.6 | 17.9 |
| Organizing young farmer and adult farmer classes | 25.6 | 26.9 | 16.7 | 25.0 | 42.5 | 30.2 | 27.5 | 27.6 |
| They do not seem inadequate | 23.1 | 23.1 | 9.5 | 21.4 | 7.5 | 14.0 | 15.6 | 19.5 |

Note: Respondents were allowed to identify more than one qualification.

experience programs of students" as being subjects or areas in which their vocational agriculture teachers seem inadequate.

No significant differences (p=.05) were found to exist between the various groups of administrators in regard to how the teacher of vocational agriculture should use his or her time during the school day. However, significant difference (p=.05) was found to exist in the opinions of the principals between the two time periods, $X^2$ =7.246, (dF = 2, C.V. = 5.99). As is reported in Table 10, the majority of all administrators, 74.4% in 78-79 and 81.3% in 85-86) indicated that teachers of vocational agriculture should teach only classes of vocational agriculture including supervised experience instruction. While not significant, the percentage of all administrators who indicated that teachers of vocational agriculture should teach one or more classes other than agriculture (including study hall) decreased from 17.5% in 78-79 to 13.8% in 85-86.

There were no significant differences (p=.05) found when comparing the perceptions of the different groups of administrators regarding the types of extra-curricular duties teachers of vocational agriculture should be required to perform for the two time periods. However, there were significant differences among the groups in both years, $X^2$=16.395 (df=4, C.V. =9.49) in 78-79 and $X^2$=11.751 (df=4, C.V. =9.49) in 85-86. As reported in Table 10, over 80% of all administrators indicated that it was their opinion that teachers of vocational agriculture should be required to perform the same extra-curricular duties as other teachers.

Table 10.
Opinions of 1978-79 and 1985-86 School Administrators Regarding How Teachers of Vocational Agriculture Should Use Their Time During the School Day and the Extra-Curricular Duties They Should be Required to Perform

| | Principals | | Superintendents | | Directors | | Combined Total | |
|---|---|---|---|---|---|---|---|---|
| Responsibilities | 78-79 (N=78) % | 85-86 (N=52) % | 78-79 (N=42) % | 85-86 (N=28) % | 78-79 (N=40) % | 85-86 (N=43) % | 78-79 (N=160) % | 85-86 (N=123) % |
| Time During School Day: | | | | | | | | |
| Teach only classes of vocational agriculture | 65.4 | 80.8 | 73.8 | 67.9 | 92.5 | 90.7 | 74.4 | 81.3 |
| Teach one or more classes other than agriculture | 23.1 | 19.3 | 21.4 | 21.4 | 2.5 | 2.3 | 17.5 | 13.8 |
| Other | 11.5 | 0.0 | 4.8 | 10.7 | 5.0 | 7.0 | 8.1 | 4.9 |
| Extra-Curricular Duties: | | | | | | | | |
| Same duties as other teachers | 93.6 | 86.5 | 83.3 | 96.4 | 67.5 | 69.8 | 84.4 | 83.0 |
| Only those duties pertaining to vo- ag | 6.4 | 13.5 | 11.9 | 3.6 | 30.0 | 23.3 | 13.8 | 14.6 |
| Other | 0.0 | 0.0 | 4.8 | 0.0 | 2.5 | 7.0 | 1.8 | 2.4 |

## CONCLUSIONS

To the extent that the facts obtained and the opinions expressed are accurate, and insofar as respondents are representative of the whole, the following conclusions may be drawn as of the time this study was made:

1. Administrators seemed to be in general agreement that the main purpose of Vocational Agriculture is to train high school students for gainful employment in agricultural occupations. This is in keeping with the philosophy of vocational education as the main purpose for the existence of vocational agriculture programs.
2. Administrators perceive that their communities consider vocational agriculture as important, especially for those students interested in an agriculturally related occupation. They also believe that those students who are truly interested in agriculture are the ones who take vocational agriculture courses.
3. Administrators also consider knowledge of agriculture and its importance in our society as an important aspect of vocational agriculture programs in addition to preparing students for employment in agriculturally related occupations. Administrators do not evaluate the quality of vocational agriculture programs by the number of program graduates entering farming or agriculturally related occupations.
4. Administrators perceive that vocational agriculture teachers need improvement in the areas of professional improvement, cooperation with administration, cooperation with other faculty members, and grooming while in school.
5. Administrators perceive that many vocational agriculture teachers are inadequate in the areas of housekeeping, discipline of students, methods of teaching, and organizing young farmer and adult farmer classes.
6. Administrators acknowledge the fact that teachers of vocational agriculture should teach only classes of vocational agriculture and be responsible for supervised occupational experience programs. Most administrators indicate that study hall or other activities should not be included as part of the teachers' job.
7. Administrators indicate that the relative work load of teachers of vocational agriculture, including extra-curricular activities should be about the same as other teachers in the system.
8. Principals differ with superintendents and vocational education directors in that they perceive more of a need for vocational agriculture programs to be general in nature and to provide genernal knowledge of agriculture. The majority of the principals feel that the percentage of students who enter farming or agriculturally related occupations should not be used as a means of justifying vocational agriculture programs. The superintendents and vocational education directors express more of a philosphy that the programs should be vocational in nature.
9. In most instances the perceptions of the three types of school administrators remained the same in 1985/86 as they were in 1978/79. This would tend to indicate that the level of administrative support has not declined for vocational agriculture programs in North Carolina even though there is the national movement for excellence in education that would limit enrollment in vocational education courses for many students.

## RECOMMENDATIONS

1. Considering the opinions expressed by principals, consideration should be given to increasing the number of general and/or introductory agricultural courses offered for the public schools. This might be best accomplished by expanding agricultural offerings to the middle and elementary grades.
2. Communication lines need to be developed and maintained between administrators and those concerned with agricultural education . Administrators should be kept attuned with such items as placement and curriculum and program changes.

3. Agricultural Education preservice and inservice programs should be sensitive to areas identified by administrators as beening inadequate.
4. Similar studies should be conducted in other states and on a systematic basis.

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# QUALITY INDICATORS USED IN HIRING: A COMPARISON OF DEANS OF EDUCATION AND CHIEF ADMINISTRATORS OF AGRICULTURAL EDUCATION DEPARTMENTS

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## INTRODUCTION

The quality of teacher education programs is dependent upon the caliber of faculty associated with the programs. Yet, faculty selection decisions are made on a wide variety of personnel data. These data are often assumed to be indicators of quality. A review of information sources indicates rather clearly that there is a definite lack of consensus as to the essential and valid data elements to be used in these processes.

The standards for faculty selection by accrediting groups such as NCATE are broad and general and provide only minimums of academic preparation, scholarly performance and experience. How accreditation standards and other personnel data are utilized and interpreted as indicators of quality in the hiring process merits research.

The faculty population in the approximately 1300 colleges, schools or departments of education (SCDE's) in the United States is quite large and, therefore, would be considered an open profession. The faculty population in individual departments such as agricultural education (90 departments) is small and by definition would be considered a closed profession because the individuals involved are more intimately acquainted (Post, 1971). The question addressed in this study was how do the quality indicators used in faculty selection vary between the identified open population of chief administrators (CEO's) of SCDE's and the closed profession of CEO's of agricultural education departments (AED's).

## RESEARCH QUESTIONS

The following research questions were addressed:

1) What are the most important indicators of quality used in faculty selection in colleges or schools of education and in departments of agricultural education?
2) Do quality indicators used vary based on group studied (college or school of education and agricultural education department)?

## PROCEDURES

The first group surveyed in 1985 consisted of a sample of 243 CEO's of SCDE's throughout the United States in both public and private institutions. The second group surveyed consisted of the 90 CEO's of AED's in the United States, and was completed in the spring of 1986.

Both groups were surveyed by use of a mailed instrument. The instrument was developed by Moore (1985). He used personal interviews, in addition to the literature, to develop the pilot instrument. The instrument was reviewed by a panel of experts and pilot tested by the American Association of Colleges of Teacher Education (AACTE) Board of Directors.

The instrument consisted of 56 indicators of quality clustered into eight categories: academic preparation, professional experience, evidence of scholarship, documentation of teaching effectiveness, personal qualities, service activities, candidate's personal professional development and leadership qualities. The instrument had Cronbach's alpha reliability coefficients varying from .86 to .94 on the eight category subsets. Each indicator received two responses. The importance of indicators in hiring was evaluated on a five-point scale of essential (5) to no value or opinion (1). Secondly, respondents were asked to rank order from 1 (high) to 6 (low) the six most important indicators in each category. In the second part of the instrument respondents were asked to indicate the eight most important indicators used in faculty selection. Respondents were also asked to rank order data collection sources and procedures as to their use in the final employment decision.

Responses were received from 178 CEO's of SCDE's (154 usable) and from 73 CEO's of AED's. A representative sample of 40 responses of the SCDE group with the same completed subsets as the AED group were generated by the computer program in the comparison. A follow up of CEO's of AED's was completed and found nonrespondents not to be different, no follow up was conducted on CEO's of SCDE's.

Data analysis included ranks and frequencies. The eight highest ranking indicators for initial selection of faculty members were identified by examining the frequency of ranks (one to eight) given the top ten indicators selected by each of the 154 respondents. A weighted rank score was developed to determine the top indicators. The Kruskal-Wallis one-way ANOVA by ranks was used for comparing demographic groups. The alpha level was set at $\underline{p} < .05$.

## RESULTS

Results showed that the following eight criteria were ranked by CEO's of SCDE's to be the most important indicators of quality for initial employment: (1) Preparation in area of specialization; (2) Unquestionable personal integrity; (3) Number of publications in refereed journals; (4) Specificity as to previous teaching assignments and type of institution in which it occurred; (5) Supervisor statements; (6) Emotional stability; (7) Formal presentations in a seminar setting during iterview process, and, (8) High energy and/or motivational level.

The quality indicators rated highest by CEO's of AED's were: (1) Unquestionable integrity; (2) Preparation in an area of specialization; (3) Compatibility with colleagues; (4) Publications in refereed journals; (5) Number of years of teaching experience in elementary/secondary schools; (6) High energy and/or motivational level; (7) Supervisor comments and (8) Preparation in research and statistics.

In the area of academic preparation CEO's in SCDE's considered preparation in an area of specialization more important than CEO's of AED's (Table 1).

Table 1
Mean Rank of Academic Preparation Indicators by Administration

|  | Administration |  |  |
|---|---|---|---|
|  | CEO's SCDE | CEO's AED |  |
| Indicator | (n=40) | (n=73) | $\chi^2$ |
| Preparation in an area of specialization | 68.7 | 50.6 | 7.9 |

$p < .05$

When the two groups were compared on experience, number of years and quality of experience were more important indicators of quality in agricultural education while specificity as to teaching assignment and type of institution in which it occurred carried more weight with SCDE's as shown on Table 2.

Table 2
Mean Rank of Experience Indicators by Administration

|  | Administration |  |  |
|---|---|---|---|
|  | CEO's SCDE | CEO's AED |  |
| Indicator | (n=40) | (n=73) | $\chi^2$ |
| Number of years and quality of teaching assignments | 38.1 | 67.3 | 20.6 |
| Specificity as to teaching assignment and type of institution in which it occurred | 65.6 | 52.3 | 4.3 |

$p < .05$

The personal qualities and data section shown on Table 3 had eight items, five of which differed significantly between the groups. CEO's of SCDE's placed more importance on racial/ethnic background. Those in charge of hiring in AED's placed greater importance on four items: unquestionable integrity, acceptable moral beliefs and practices, compatibility with colleagues, and emotional stability.

Table 3
Mean Rank of Personal Qualities/Data Indicators by Administration

| | Administration | | |
|---|---|---|---|
| | CEO's SCDE | CEO's AED | |
| Indicator | (n=40) | (n=73) | $\chi^2$ |
| Racial/ethnic background | 67.3 | 51.3 | 6.1 |
| Unquestionable integrity | 45.6 | 63.3 | 7.5 |
| Acceptable moral beliefs and practices | 37.1 | 67.9 | 22.7 |
| Compatibility with colleagues | 46.9 | 62.55 | 13.3 |
| Emotional stability | 43.8 | 64.2 | 10.0 |

$p < .05$

The documentation of teaching effectiveness section data indicated one area of difference (Table 4). Agricultural education CEO's placed greater importance on teacher solicited evaluations.

Table 4
Mean Rank of Documentation of Teaching Effectiveness Indicators by Administration

| | Administration | | |
|---|---|---|---|
| | CEO's SCDE | CEO's AED | |
| Indicator | (n=40) | (n=73) | $\chi^2$ |
| Teacher solicited student evaluation | 47.8 | 62.1 | 4.9 |

$p < .05$

In the evidence of scholarship section those respondents from SCDE's reported elected offices in professional organizations and the number of monographs/books authored as more important than those for AED's as can be seen on Table 5. Those in charge of hiring for AED's placed greater importance on GRE, MAT or other standardized test scores.

Table 5
Mean Rank of Evidence of Scholarship Indicators by Administration

| | Administration | | |
|---|---|---|---|
| | CEO's SCDE | CEO's AED | |
| Indicator | (n=40) | (n=73) | $\chi^2$ |
| Elected officers in professional organizations | 68.7 | 50.6 | 7.9 |
| Number of monographs/books authored | 71.2 | 49.2 | 11.6 |
| GRE, MAT or other standardized test scores | 46.7 | 62.6 | 6.5 |

$\underline{p} < .05$

In the area of service activities shown on Table 6, committee responsibilities at the university level, was considered more important in SCDE's while amount and quality of advising responsibilities item was considered more important in AED's.

Table 6
Mean Rank of Service Activities Indicators by Administration

| | Administration | | |
|---|---|---|---|
| | CEO's SCDE | CEO's AED | |
| Indicator | (n=40) | (n=73) | $\chi^2$ |
| Committee responsibilities at university level | 68.0 | 51.0 | 6.9 |
| Amount and quality of advising responsibilities | 47.6 | 62.1 | 5.1 |

$\underline{p} < .05$

Participation in workshops/conferences was the only item in the candidates' personal professional development (Table 7) section of the instrument on which the two groups varied significantly. Such participation was considered more important by CEO's of AED's. The two groups did not vary on their responses to the leadership potential/qualities items.

Table 7
Mean Rank of Candidates' Personal Professional Development Indicators by Administration

| | Administration | | |
|---|---|---|---|
| | CEO's SCDE | CEO's AED | |
| Indicator | (n=40) | (n=73) | $\chi^2$ |
| Participation in workshops and conferences | 45.1 | 63.5 | 8.2 |

$p < .05$

Part IV of the instrument dealt with data sources and procedures. Upon observing the mean scores for the two groups on individual items, some numerical differences were found but not enough to be of practical difference so no further statistical analysis was completed. Both groups lowest mean score of importance was credential files which had been reviewed by applicants. Oral recommendations by current or former employers and from known professionals as well as vitas submitted were given higher mean scores of importance by both groups.

## CONCLUSIONS AND RECOMMENDATIONS

The data indicate statistical variances between chief administrators of SCDE's and chief administrators of AED's on 15 of the quality indicators. Six of those 15 indicators were ranked among the top eight indicators of the individual groups. It is unclear as to the causes of such differences. They may be due to differences in philosophy and/or breadth of responsibilities.

The study has practical significance for all agricultural education departments as they employ new faculty. Those departments which are in colleges of education must have involvement of and approval of the dean in the employment process. Therefore, it is important they are aware of the differences that exist between what agricultural education department heads consider as important indicators of quality and what the dean is likely to feel is important. Perhaps the position descriptions and data used in selecting faculty should be modified.

Those agricultural education departments which are in colleges of agriculture may not need the formal approval of the dean of education to hire faculty. However, to maintain good working relationships between the programs and assure credibility of new faculty, being aware of the differences in the importance of quality indicators is necessary. In order to gain support for new faculty in agricultural education departments by deans of education those indicators of importance can be highlighted.

Although these investigations did not directly address the quandry of delineating the quality indicators used subsequent to employment, it is reasonable to expect that there should be high correlation with the criteria used in the employment process. If that, in fact, is true, then it is very important that a structured data gathering system be implemented. Such a system would need to accommodate the acquisition of data from credible sources, especially as it relates to teaching effectiveness, emotional stability, compatability with colleagues, and other personal qualities. Career decisions such as rank, tenure, and salary should be based on agreed upon quality indicators. An analysis of the position description used in the employment process with respect to prescribed qualifications as contrasted to the quality indicators used in the aforementioned career decisions may indeed be enlightening.

The qualitative decisions related to state and national accreditation usually are predicated upon varied and disparate faculty data. Secondly, there is a definite lack of consensus as to the essential data elements and the validity associated thereto. This is clearly substantiated by the differences found in this study as it relates to student evaluations of teaching and how said information is obtained. Some may want to hypothesize that the relationships between faculty and students are dependent upon the content being taught and on class size. Since anonymity does not seem to be as important in agricultural education, both the purpose of student evaluations and subsequent use of the data obtained need further clarification.

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# DETERMINATION OF THE NEED FOR EXTENSION HORTICULTURAL EDUCATION PROGRAMS FOR GARDEN CENTER EMPLOYEES

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# DETERMINATION OF THE NEED FOR EXTENSION HORTICULTURAL EDUCATION PROGRAMS FOR GARDEN CENTER EMPLOYEES

## INTRODUCTION

Ornamental plant production represents Florida's fourth most valuable agricultural commodity, following citrus, vegetables and livestock. In 1982 Florida ranked second in the U.S. in ornamental production with an estimated value of $505-million (Institute of Food & Agricultural Science, 1983).

A major channel through which plant materials make their way directly into the hands of the public is the retail garden center. A recent study of homeowner perceptions of retail garden centers in one Florida county found that a third of the respondents indicated garden centers as their primary source of plant materials (Zerba, 1984). Through the marketing of plants, direct contact is made between garden center personnel and the public, providing opportunity for exchange of horticultural information. For some individuals, contact with garden center personnel may be their only link with a potential source of horticultural information. Therefore, the retail garden center represents a potential channel for significant communication of such information.

In a study designed to determine horticultural information sources utilized by the public, Guidry (1974) concluded that most respondents utilized garden centers as their primary source of horticultural information. While most respondents believed stores selling plants should assume an educational role, Guidry's study revealed garden center personnel were in need of additional horticultural information to address typical homeowner requests for information.

It seems logical, when provided with supplemental education to address homeowner informational needs, garden center personnel could greatly extend the educational impact of the county extension agent by broadening the opportunities of reaching the public. In this respect, the retail garden center may well serve as an avenue for broad dissemination of horticultural information, thereby extending the educational function of the Cooperative Extension Service.

## PURPOSE AND OBJECTIVES OF THE STUDY

The study was designed to determine the need for extension horticultural education programs for garden center employees. To accomplish this, the primary objectives of the study were:

1. To determine the characteristics of garden center personnel with respect to age, sex, training in horticulture, length of employment at present garden center and previous horticultural work experience.

2. To determine types of horticultural information that the public requests of garden center personnel.

3. To determine garden center employee perceptions of their ability to respond to requests for horticultural information.

4. To determine garden center managements' perceptions of their employees' ability to respond to requests for horticultural information.

5. To determine if there was a difference between perceived ability to respond to requests for horticultural information according to the demographic characteristics of sex, previous horticultural work experience, horticultural training and personnel status.

6. To determine the interest of garden center personnel in learning more about horticultural subject matter.

7. To determine if garden center personnel utilize the Cooperative Extension Service as an information source.

## RESEARCH PROCEDURE

The target population of the study included forty-five garden centers in Volusia County, Florida. Volusia is a coastal county in central Florida made up of both rural and urban populations of approximately 307,000 residents. The researcher found this county to be a typical county within Florida and economically accessible to carry out the study.

In accordance with sample size tables (Anderson & Berdie, 1978), forty garden centers were randomly selected from the population of forty-five to achieve a ninety-five percent confidence level. The instrument used to gather data in this descriptive study was a closed-form questionnaire designed to elicit desired information with the least amount of time spent by the respondent. Items included in the questionnaire were formulated as the result of reviewing relevant literature and content validity was established by three professors in the Department of Agricultural and Extension Education and an Urban Horticultural Specialist of the Cooperative Extension Service.

The resulting questionnaire was designed to obtain data regarding:

(1) demographic characteristics of garden center personnel

(2) perceptions of employees' ability to respond to requests for horticultural information

(3) types of horticultural information that the public requests of garden center personnel

(4) garden center personnel's interest in learning more about horticulture

(5) garden center personnel's utilization of the Cooperative Extension Service as an informational source

In an attempt to maximize responses, the researcher conducted on-site interviews. Of the forty garden centers randomly selected for the study, thirty seven garden centers agreed to allow the reseacher to interview their employees. Within the thirty-seven garden centers (92.5%) there were 96 potential respondents. An attempt was made to interview all 96 employees. All data were collected in September 1984.

To increase the rate of response, some garden centers had to be revisited to interview employees not present on the day of the initial interview. Additional responses were generated by on-site interviews at garden center flea market outlets. A third follow-up was made by telephone contacts of garden center personnel not previously interviewed. As a result of these four contacts, a total of seventy-nine (82.3%) garden center personnel were interviewed. No attempt was made to follow-up on the seventeen non-respondents.

## SUMMARY OF RESULTS

The central purpose of the study, to determine the need for Extension horticultural education programs for garden center employees, was accomplished by way of seven objectives.

The first objective sought to determine characteristics of garden center personnel with respect to age, sex, training in horticulture, length of employment at their present garden center and previous horticulture work experience. Data indicated that one-half of the respondents were in two age categories 25 to 35 years and over 55 years. The mean number of years respondents had worked in the field of horticulture was 8.9 and the mean length of employment at their present garden center was 6.6 years.

Table one reveals that approximately 60% of the garden center personnel had no previous horticultural experience. Respondents with prior experience were asked to specify types of work experience according to the following categories: (1) another garden center, (2) nursery operation, (3) lawn maintenance and (4) others. Ten percent of the respondents had previously worked in nursery operations and 7.5% of the garden center personnel had experience in lawn maintenance. Of the 14 respondents with other types of work experience, five respondents had experience in home gardening, four respondents had some landscaping experience, three respondents had farming experience and two respondents had experience working for the State Park Service. Of the respondents with horticultural training, more than half had been enrolled in a two-year community college program and more than a third had taken horticultural short courses.

Table 1

Frequencies and Summary Statistics
For Previous Horticultural Work Experience
(n = 79)

| Types of Experience | Frequency | Percent |
|---|---|---|
| No Previous Experience | 46 | 58.3 |
| Another Garden Center | 5 | 6.3 |
| Nursery Operations | 8 | 10.3 |
| Lawn Maintenance | 6 | 7.5 |
| Others | 14 | 17.7 |
| Total | 79 | 100 |

The second objective sought to determine types of horticultural information the public requested of garden center employees. Horticultural subject areas were ranked by garden center personnel from one to nine indicating most to least frequently requested horticultural subjects.

As indicated in Table 2, plant identification was ranked as the most frequently requested horticultural subject with a mean ranking of 3.6. With mean rankings as 4.0 and 4.1, plant selection and fertilization and soil amendments were ranked as the second and third most frequently requested subjects. Watering practices, plant pests and control, planting practices and plant disease and control were ranked as the fourth through seventh most frequently requested horticultural subjects. The least requested subjects were pruning, training, staking and mowing, and plant design. These subject areas had mean rankings of 6.8 and 7.3 respectively.

Table 2

Ranking of Horticultural Subject Areas
By Garden Center Personnel
(n = 79)

| Subject Areas | Mean Ranks* | Overall Ranks |
|---|---|---|
| Plant Identification | 3.6 | 1 |
| Plant Selection | 4.0 | 2 |
| Fertilization and Soil Amendments | 4.1 | 3 |
| Watering Practices | 4.2 | 4 |
| Plant Pests and Control | 4.3 | 5 |
| Planting Practices | 4.7 | 6 |
| Plant Disease and Control | 4.9 | 7 |
| Pruning, Training, Staking and Mowing | 6.8 | 8 |
| Plant Design | 7.3 | 9 |

*Rating Scale: 1 = most frequently to 9 = least frequently requested horticultural subjects.

The third objective attempted to determine garden center employees perception of their ability to respond to requests for horticultural information.

As indicated in Table 3, 90% of garden center employees perceived they could respond to requests for information on plant identification most or all of the time. Plant identification ranked as the most frequently requested horticultural subject. More than 80% of the respondents perceived they could respond to most or all requests for information on: plant selection; fertilization and soil amendments; watering practices; planting practices; and pruning, training, staking and mowing. These subject areas were ranked as the second, third, fourth, sixth and ninth most frequently requested horticultural subject areas. Approximately five to ten percent of the respondents perceived they could not effectively respond to requests for information on: plant pests and control, plant disease and control and plant design. These subjects were ranked as the fifth, seventh and ninth most frequently requested horticultural subject areas by garden center personnel.

Table 3

Frequencies and Summary Statistics for Employee-perceived Ability to Respond to Requests for Horticultural Information
(n=70)

| Subject Area | Mean Response* | All of the time |  | Most of the time |  | Some of the time |  | Never |  |
|---|---|---|---|---|---|---|---|---|---|
|  |  | Frequency | % | Frequency | % | Frequency | % | Frequency | % |
| Plant Identification | 1.9 | 10 | 14.2 | 53 | 75.7 | 7 | 10.0 | 0 | 0 |
| Plant Selection | 1.8 | 18 | 25.7 | 42 | 60.0 | 10 | 14.2 | 0 | 0 |
| Fertilization and Soil Amendments | 1.9 | 18 | 25.7 | 39 | 55.7 | 13 | 18.5 | 0 | 0 |
| Watering Practices | 1.5 | 37 | 52.8 | 30 | 42.8 | 3 | 4.2 | 0 | 0 |
| Plant Pest and Control | 2.2 | 8 | 11.4 | 41 | 58.5 | 18 | 25.7 | 3 | 4.2 |
| Planting Practices | 1.6 | 36 | 51.4 | 27 | 38.5 | 6 | 8.5 | 1 | 1.4 |
| Plant Disease and Control | 2.3 | 4 | 5.7 | 42 | 60.0 | 20 | 28.5 | 4 | 5.7 |
| Pruning, Training, Staking, and Mowing | 1.7 | 24 | 34.2 | 37 | 52.6 | 9 | 12.8 | 0 | 0 |
| Plant Design | 2.2 | 9 | 12.8 | 41 | 58.5 | 12 | 17.1 | 8 | 11.4 |

*Rating Scale: 1= All of the time; 2= Most of the time; 3= Some of the time; 4= Never.

The fourth objective attempted to determine garden center managements' perceptions of their employees' ability to respond to requests for horticultural information. All garden center managers felt their employees could respond to either most or all requests for horticultural information on: (a) plant identification; (b) plant selection; (c) fertilization and soil amendments; (d) watering practices; (e) planting practices; and (f) pruning, training, staking and mowing. Aproximately 11% of the garden center managers did not feel their employees could effectively respond to requests for information on plant design.

Objective five sought to determine if there was a difference between perceived ability to respond to request for horticultural information according to the demographic characteristics of previous horticultual work experience, horticultural training and personnel status. In comparing this ability to respond to requests for horticultural information according to work experience, there was no statistical difference (t= 1.08) in overall means for those with or without experience.

Concerning perceived ability to respond to requests for horticultural information according to horticultural training, there was no statistical difference in overall mean responses (t= 2.07) for those respondents with or without horticultural training.

The sixth objective attempted to determine the interest of garden center personnel in learning more about horticultural subject matter. Data in Table 4 indicate that over 90% of the respondents were interested in learning more about horticultural subject matter.

Table 4

Frequencies and Summary Statistics for Garden Center
Personnel's Interest in Learning More
About Horticulture
(n=79)

| Interest in Learning More about Horticulture | Frequency | Percent |
|---|---|---|
| Very Interested | 37 | 45.6 |
| Fairly Interested | 37 | 46.8 |
| Not Interested | 6 | 7.6 |
| Total | 79 | 100 |

Mean Response: 1.62
*Rating Scale: 1= Very Interested; 2= Fairly Interested
3= Not Interested.

Sixty four percent of the respondents indicated an interest in receiving horticultural information by being placed on the Cooperative Extension Service mailing list to receive newsletters. Data also indicated that 36.0% of the personnel preferred receiving extension publications, while 16.0% of the respondents would prefer receiving horticultural information by way of informal meetings. These data are summarized in Table 5.

Table 5

Frequencies and Summary Statistics For Garden Center Personnel's Preferred Methods of Receiving Horticultural Information (n = 75)

| Methods of Receiving Information | Frequency | Percent |
|---|---|---|
| Mailing List to Receive Newsletters | 48 | 64.0 |
| Extension Publications | 27 | 36.0 |
| Personal Contact with the County Agent | 7 | 9.3 |
| Formal Classes | 10 | 13.3 |
| Informal Meetings | 12 | 16.0 |

The seventh objective sought to determine if garden center personnel utilized Cooperative Extension Service as an information source. Data indicated that approximately 55% of garden center personnel utilized the Cooperative Extension Service as an informational source at least once in a year.

Data were also collected on the means by which garden center personnel utilized the Cooperative Extension Service. Of the 44 respondents that utilized the Cooperative Extension Service, 75.0% requested information from the county agent and 25.0% attended extension meetings. It may also be noted that 22.2% of the respondents referred customers to the Cooperative Extension Service.

## CONCLUSIONS

Based upon the data collected, the following conclusions about the respondents were made. These conclusions are limited to the respondents because only 92.5% of the garden centers agreed to participate and only 82.3% of the garden center employees in the centers were actually interviewed.

1. There is a need for extension horticultural education programs for garden center personnel. Based on responses, the greatest need for programming is in the areas of plant pests and control; plant disease and control; and plant design.
2. The types of horticultural information that the public most frequently request of garden center employees are plant identification and plant selection.
3. Garden center employees perceived they could respond to most customer requests for horticultural information.
4. Garden center managers perceived their employees were more knowledgeable in horticulture than employees perceived themselves to be.
5. Perceived ability to respond to requests for horticultural information does not appear to be related to the demographic characteristics of sex, previous horticultural work experience or horticultural training.
6. Garden center personnel are interested in horticultural education programs. Most personnel indicated a preference for receiving written horticultural information via extension newsletters and extension publications.
7. Based on responses, some garden center personnel utilize the Cooperative Extension Service as an information source.

## RECOMMENDATIONS

Based on the findings and conclusions drawn from this study, the following recommendations are deemed appropriate:

1. The results of this study should be made available to extension administrators, extension agents and other individuals responsible for planning and providing horticultural education programs.

2. Similar studies should be conducted in other counties throughout the state to further understand the need for horticultural education programs for garden center employees.

3. Further study should be conducted to determine the need for horticultural education programs for personnel of retail department stores.

4. Extension agents could best address garden center personnel need for additional horticultural information by focusing educational programs on the following areas: plant pests and control; plant disease and control; and plant design.

5. Since a high percent of respondents indicated a desire for horticultural information via newsletters, extension publications and personal contact with the county agent, extension should attempt to meet the needs of clients by providing timely and useful information by these means.

6. County extension agents should attempt to reach the population of garden center personnel who do not utilize the Cooperative Extension Service by extending their newsletter mailing list.

7. Further study should be conducted to verify the extent to which employees perceptions are correct.

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# MANAGING LABORATORY INSTRUCTION:
# THE EFFECTS OF CONCENTRATED MENTAL PRACTICE ON OXY-FUEL GAS SKILL DEVELOPMENT

Paper Presented at the
Southern Agricultural Education Research Meeting

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# MANAGING LABORATORY INSTRUCTION: THE EFFECTS OF CONCENTRATED MENTAL PRACTICE ON OXY-FUEL GAS SKILL DEVELOPMENT

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## INTRODUCTION

In American education a major contemporary issue is teacher preparation, training, and performance (McCormick, 1985). Teacher education is under scrutiny by society and itself in search of more effective ways to prepare teachers. Agricultural education is not exempt from such investigations and implications for program improvement. Since skill acquisition is one of the primary justifications for all vocational programs, as noted by the Smith-Hughes Act (Barlow, 1967), it is of particular significance to programs of agricultural education, especially their mechanization components (Polson, 1985).

Instruction in agricultural mechanization relies substantially upon development of cognitive and psychomotor skills. Researchers have theorized for some time that mental practice is effective in helping students learn psychomotor skills. Robb (1972) noted that in the beginning stages of learning, understanding is important for students. Martniuk (1976) further related that the early stages of psychomotor learning must be treated as cognitive in nature. Martniuk noted that at the introduction of new material, mental practice is effective in helping students grasp desired psychomotor concepts.

Research in other disciplines indicates that psychomotor skill performance is enhanced when combined with different forms of mental practice. Krenz (1984) reported that athletic training included mental training as part of the conditioning program. Athletes in the Krenz study self-reported that mental training helped improve competitive performances.

Some researchers have suggested that the concept of mental practice should be more extensively used in the educational setting (Vedelli 1979, Jokl 1966, and Johnson 1979). Research by Dillbeck, Assimakis, Raimond, Orme-Johnson, and Rowe (1986) related that meditation, a form of mental practice, does increase the effectiveness of cognitive ability and style.

Evidence suggests that cognitive understanding and knowledge of the sequence of psychomotor movements are essential to skill learning. Thus concentrated mental practice, a mental rehearsal of skills prior to actual execution, as used in other disciplines, may be an effective tool which can be applied to psychomotor skill learning.

## PURPOSE AND OBJECTIVES

The purpose of this study was to determine the effects of concentrated mental practice upon oxy-fuel gas welding skill development. Specific objectives were to determine the effects of concentrated mental practice upon developing the following psychomotor skills:

1. Fusing a low carbon steel tent joint without the use of filler rod.
2. Fusing a low carbon steel butt joint with the use of filler rod.
3. Brazing a low carbon steel butt joint with the use of filler rod.

## METHOD AND PROCEDURES

This investigation was conducted as a clinical study using a true experimental design. A pretest-posttest control group design was used to assist in controlling threats to internal validity (Campbell & Stanley, 1963). Subjects were students enrolled in the Virginia Tech, agricultural engineering course Agricultural Metal Fabrication, AgE 3131 winter quarter, 1986. Seventeen students were enrolled in the course. Nine students ( 6 males and 3 females) made up the experimental group and 8 students (6 males and 2 females) made up the control group. These students were individuals preparing for positions as teachers of vocational agriculture or other endeavors in the industry of agriculture.

### Instrumentation

Two instruments were used for data collection. The visual inspection instrument was an established, 6 part, rating scale which used industry based criteria to evaluate coupons (Althouse,A., Turnquist,C., Bowditch, W., & Bowditch, K.1984; Giachino & Weeks,1976). Each of the 6 parts of the rating scale were assigned a point value. The total point value of the scale was 100 points. The second instrument was researcher prepared and used to record tensile test data taken from a Tinius Olsen tensile testing machine. To assure reliable readings for engineering and industry research, the manufacturer has tested the machine periodically for accuracy since installation; to date, no adjustments have been needed on this tensile testing machine. This tensile testing machine is one of few of its capacity in the region, and is used extensively by industry as well as the University for tensile strength testing of materials.

## Procedures and Analysis

The subjects in this study were randomly assigned to groups. Treatments and order of treatment were also randomly assigned. The subjects were asked to prepare: a puddle weld, a tent weld using the fusion process without a filler rod, a fusion bead with a filler rod, a butt joint fusion weld with a filler rod, a braze welded bead and a braze welded butt joint. The tent weld, butt joint fusion weld and braze welded butt joint were reported in the study because they could be evaluated by visual inspection as well as machine evaluated for tensile strength.

Simultaneous classroom instruction, relative to safety and basic knowledge needed for oxy-fuel gas welding, was given to all students in the study. The time provided for classroom instruction was in addition to the time provided for laboratory practice. During laboratory practice, facility limitations required that one group be involved in an alternate activity while the second group participated in oxy-fuel gas welding. Students were divided into experimental (treatment) and control groups. Each group received 15 hours of skill instruction and practice. Laboratory skill instruction for both groups consisted of a demonstration of all welds followed by a pretest. Each weld was then demonstrated a second time and discussed on the day it was assigned to be performed. Individual instruction was provided to subjects as needed and requested.

Each laboratory session was divided into six, 30 minute periods. The first period was used for demonstrations, the next four periods were used for individual practice and concentrated mental practice and the final period was used for preparing coupons for evaluation.

The treatment for the experimental group took place within the four periods provided for individual practice. Within each 30 minute period, 20 minutes were allowed for practice and instruction, the remaining 10 minutes were used by students to concentrate mentally on the correct manipulations required to complete the weld being studied. All oxy-fuel gas welders were turned off and students were supervised during each 10 minute concentrated practice session to assure that time was used for the mental concentration activity. Time periods were established, called and supervised by the researcher.

Control group subjects received laboratory practice and instruction as it is traditionally taught in the Agricultural Engineering 3131 Metal Fabrication course. Control group instruction consisted of laboratory demonstrations with keypoint discussion and uninterrupted laboratory practice. Individual instruction and assistance was provided as needed and requested. The final 30 minutes of each laboratory session was reserved for preparing coupons to be evaluated, and which were assigned for the laboratory period.

To minimize the effect of extraneous variables the following items were constant for all subjects during the experiment: metal thickness and composition, welding tip size, volumetric flow of oxygen and acetylene, fusion welding rod diameter, and brazing rod diameter. To eliminate researcher bias while performing visual inspections, names on the weld coupons were covered prior to and during the visual inspection evaluations.

Welds were evaluated by visual inspection and tensile test procedures using industry accepted criteria. All evaluations were performed by the researcher. Test coupons were sawed from the welded joints prepared by each student. Coupon size was not consistent for all students, however tensile strength calculations were made based upon the measured size of each coupon. This procedure yielded a tensile strength value per square inch of weld for each coupon. The calculated tensile strength values were used in all analyses. Independent t-tests were used to analyze and interpret the data. An alpha level of .05 was used to ascertain significance.

## FINDINGS

Visual inspections and tensile test evaluations were performed on each weld. To determine the effects of treatment, mean scores on visual inspections and tensile tests were compared as follows: pretest-posttest for the experimental group, pretest-posttest for the control group, pretests between the experimental and control groups, and posttests between the experimental and control groups.

Table 1 data indicate that significant differences were found between pretest and posttest visual inspection scores for both the experimental and control groups on the tent, fusion and brazed weld measures.

Table 1

**Visual Inspection Pretest-Posttest Comparisons for Tent, Fusion, and Brazed Welds**

| Item | Tent Weld |  | Fusion Weld |  | Brazed Weld |  |
|---|---|---|---|---|---|---|
|  | Pretest | Posttest | Pretest | Posttest | Pretest | Posttest |
| **Exp. Group:** |  |  |  |  |  |  |
| N=9 |  |  |  |  |  |  |
| Mean | 53.89 | 84.89 | 38.68 | 83.44 | 54.56 | 84.44 |
| Std. Dev. | 25.84 | 4.81 | 26.30 | 9.58 | 16.10 | 5.00 |
| T-Value | 3.5386* |  | 4.7998* |  | 5.3132* |  |
| **Control Group:** |  |  |  |  |  |  |
| N=8 |  |  |  |  |  |  |
| Mean | 58.50 | 87.75 | 47.88 | 85.13 | 43.75 | 88.13 |
| Std. Dev. | 19.92 | 6.32 | 29.02 | 7.49 | 11.40 | 5.20 |
| T-Value | 3.9586* |  | 3.5154* |  | 10.0106* |  |

_Note._ p<0.05*

The data in Table 2 indicate that no significant differences were found between experimental and control groups when visual inspection pretest scores were compared on tent, fusion and brazed welds. Posttest visual inspection comparisons in Table 2 relate that no significant differences were found between experimental and control groups on visual inspection measures taken for the tent, fusion or brazed welds.

Table 2

**Visual Inspection Comparisons for Experimental and Control Groups for Tent, Fusion, and Braze Welds**

| Item | Tent Weld |  | Fusion Weld |  | Brazed Weld |  |
|---|---|---|---|---|---|---|
|  | Exp. | Control | Exp. | Control | Exp. | Control |
| **Pretest:** |  |  |  |  |  |  |
| N | 9 | 8 | 9 | 8 | 9 | 8 |
| Mean | 53.89 | 58.50 | 38.67 | 47.88 | 54.56 | 43.75 |
| Std. Dev. | 25.84 | 19.92 | 26.30 | 29.02 | 16.10 | 11.40 |
| T-Value | .4079 |  | .6866 |  | -1.5767 |  |
| **Posttest:** |  |  |  |  |  |  |
| N | 9 | 8 | 9 | 8 | 9 | 8 |
| Mean | 84.89 | 87.75 | 83.44 | 85.13 | 84.44 | 88.13 |
| Std. Dev. | 4.81 | 6.32 | 9.58 | 7.49 | 5.10 | 5.20 |
| T-Value | 1.0582 |  | .3990 |  | 1.4759 |  |

p<0.05*

The data in Table 3 show that significant differences did exist between the pretest and posttest tensile strength scores on the fusion and brazed welds for both the experimental and control groups.

Table 3

**Tensile Strength Pretest-Posttest Comparisons of Tent, Fusion and Brazed Welds**

| Item | Tent Weld |  | Fusion Weld |  | Brazed Weld |  |
|---|---|---|---|---|---|---|
|  | Pretest | Posttest | Pretest | Posttest | Pretest | Posttest |
| **Exp. Group:** |  |  |  |  |  |  |
| N=9 |  |  |  |  |  |  |
| Mean | 7025.2 | 11845.9 | 23992.4 | 39913.4 | 21525.7 | 36949.1 |
| Std. Dev. | 11615.0 | 12499.6 | 17313.8 | 12346.0 | 16329.9 | 4442.4 |
| T-Value | .8485 |  | 2.246* |  | 2.7341* |  |
| **Control Group:** |  |  |  |  |  |  |
| N=8 |  |  |  |  |  |  |
| Mean | 10932.0 | 12206.0 | 38135.6 | 71864.4 | 27436.4 | 72836.3 |
| Std. Dev. | 16353.0 | 16607.4 | 14578.1 | 5173.6 | 13534.0 | 2761.3 |
| T-Value | -.1545 |  | 6.1672* |  | 9.2964* |  |

$p<0.05$*

Table 3 data also show that no significant difference occurred between pretest and posttest mean scores of the experimental and control groups when the tent welds were tested for tensile strength.

The data in Table 4 indicate that on the tent, fusion and brazed welds no significant differences in the tensile strength were found between the pretest of the experimental group and the pretest of the control group. Posttest comparisons between the experimental and the control groups, shown in Table 4, indicate there were significant differences in tensile strengths of the posttest fusion and brazed welds. Table 4 data further shows there was no significant difference in tensile strength between the experimental and control groups on the tent weld posttest measure.

Table 4

**Tensile Strength Comparisons Between Experimental and Control Groups for Tent, Fusion and Brazed Welds**

| Item | Tent Weld |  | Fusion Weld |  | Brazed Weld |  |
|---|---|---|---|---|---|---|
|  | Exp. | Control | Exp. | Control | Exp. | Control |
| **Pretest:** |  |  |  |  |  |  |
| N | 9 | 8 | 9 | 8 | 9 | 8 |
| Mean | 70246.6 | 10932.1 | 23992.4 | 38135.6 | 27271.2 | 27436.4 |
| Std. Dev. | 11616.4 | 16354.4 | 17313.8 | 14578.1 | 1818.9 | 13534.0 |
| T-Value | .5733 |  | 1.8084 |  | .0210 |  |
| **Posttest:** |  |  |  |  |  |  |
| N | 9 | 8 | 9 | 8 | 9 | 8 |
| Mean | 11845.9 | 12206.0 | 39913.4 | 71864.4 | 36949.1 | 69065.1 |
| Std. Dev. | 12499.6 | 16607.4 | 12346.0 | 5173.6 | 4442.4 | 10455.7 |
| T-Value | .0505 |  | 6.7899* |  | 8.4251* |  |

$p<0.05$*

## CONCLUSIONS

Based upon the findings of this study the following conclusions are drawn. It should be noted that this investigation was clinical in nature hence, the results are only generalizable to the class in which the study was conducted.

1. The use of concentrated mental practice was not significantly better than traditional teaching methods when learning to weld tent, fusion and brazed weld joints as evaluated by visual inspection criteria.
2. Based upon analysis of the fusion and brazed welds, it was concluded that traditional instructional techniques yielded weld joints significantly stronger in tensile strength than did weld joints prepared via the concentrated mental practice technique. However, posttest tensile strength comparisons for the tent weld showed no significant difference between the experimental and the control treatments.
3. Given the findings of this experiment it is concluded that traditional teaching methods were in 4 comparisons equal to and in 2 comparisons significantly better than concentrated mental practice techniques.

## Discussion and Recommendations

The mixed findings of this study make it impossible to state with certainty that the control treatment was superior to experimental treatment in helping students learn oxy-fuel gas welding skills. It should be observed that control group students spent approximately one-third more time in actual practice than did the experimental group. This difference in practice time may account for the ability of the control group to produce two of the three welds in this study with greater tensile strength values. However, based upon the posttest visual inspection comparisons of the three welds and the posttest tensile strength value for the tent weld, one may conclude that the use of concentrated mental practice was just as effective in helping students learn oxy-fuel gas welding skills as the control group procedures. If the latter conclusion is true, then perhaps some combination of concentrated mental practice and traditional teaching methods may be most effective in teaching psychomotor skill performance. This conclusion would be agreement with Martniuk (1976) who indicated that mental practice was most effective in the initial stages of skill learning.

Note should be that in four of the six comparisons made in this study, concentrated mental practice was statistically equivalent to traditional teaching methods. Although further investigation needs to be done to better quantify this finding, it should be noted that approximately one third less time was spent in actual skill practice by the experimental group. Hence, concentrated mental practice may be economically feasible to vocational programs by reducing time spent in actual skill practice, thereby reducing the quantity and costs of consumable supplies needed for skill development.

The following recommendations are offered for further investigation using concentrated mental practice:

1. Replicate the study among other classes which teach oxy-fuel gas welding.
2. Repeat the study with a larger population to enhance generalizability.
3. Replicate the study among other psychomotor skill areas.
4. Repeat the study using varied amounts of time for concentrated practice.
5. Document the cost savings for consumable supplies achieved by using the concentrated mental practice teaching technique verses traditional teaching methods.

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# THE RELATIONSHIPS BETWEEN SELECTED TEACHER PRESAGE VARIABLES AND SUPERVISED OCCUPATIONAL EXPERIENCE QUALITY

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## INTRODUCTION

In recent years, SOE has developed into an increasingly important concern throughout the profession. Research findings suggest that SOE is not being integrated with other components of the vocational agriculture program (Miller, 1980; Berkey and Sutphin, 1983; McCracken and Barrick, 1985). In most instances, the focus of these studies has been SOE in agricultural production.

Dickerson (1984) questioned whether or not we have "overemphasized production agriculture in our deliberation about SOE to the exclusion of some of the more recent additions to our curriculum such as natural resources, ornamental horticulture, or agricultural sales and service occupations?" (p. 5). Limited research findings in regard to SOE in horticulture suggested that this may indeed be the situation. Furthermore, SOE research findings that have been reported in the occupational area of horticulture warranted concern (Burnett and Smith, 1983; Zubrick, 1984; Berkey and Sutphin, 1983).

One crucial aspect of success of the SOE program was certain to be the teacher. This study focused on the horticulture teacher and the quality of supervised occupational experience in horticulture programs in Ohio. The conceptual framework for the study was derived from models of classroom teaching and learning (Dunkin and Biddle, 1974; McDonald and Elias, 1976) with an emphasis on teacher presage variables, i.e., characteristics of teachers.

## PURPOSE AND OBJECTIVES

The purpose of the study was to investigate the relationship between the quality of supervised occupational experience in horticulture and the presage variable attitude of the teacher toward SOE. The quality of SOE in vocational horticulture programs in Ohio had not been researched. More important, those teacher variables that explained the variance in the quality of SOE in horticulture programs were speculative. Empirical evidence was absent.

The following objectives guided the research study:

1. Determine the attitudes of vocational horticulture teachers toward SOE.
2. Assess SOE quality in horticulture programs.
3. Determine the relationship between attitude of the teacher toward SOE and the quality of supervised occupational experience in horticulture programs.
4. Determine the relationship between selected teacher presage variables and SOE quality in horticulture programs.
5. Determine the proportion of variance in the SOE quality of horticulture programs that can be explained by the attitude of the teacher toward SOE.
6. Determine the proportion of variance in the SOE quality of horticulture programs that can be explained by selected teacher presage variables.

## PROCEDURES

### Research Design

The research methodology was ex post facto with attitude of the teacher toward SOE the main independent variable. The following six alternative independent variables were also investigated: teacher perceptions of their SOE knowledge, teacher perceptions of administrator support for SOE, length of teaching experience, method of certification of the vocational horticulture teacher, number of years the teacher had taken vocational agriculture as a student in high school, and the number of years in which the teacher conducted an SOEP while in high school. SOE quality, the dependent variable of the study, was assessed through a randomized-block, paired comparison analysis. This analysis allowed each horticulture teacher to be compared with every other teacher on a district-wide basis. Paired comparisons were made by the respective area supervisor on the construct SOE quality. Frequency counts were then converted to standard T-scores. Essentials of the method of randomized-block, paired comparisons as outlined by Guilford (1954) were implemented.

## Instrumentation

Data were collected via a mail questionnaire. Content validity of the instrument was established by a panel of experts. Reliability of the instrument was determined through a pilot test using vocational horticulture teachers in Pennsylvania. The Cronbach standardized item alpha coefficients for the three parts of the instrument were .87, .83, and .81.

## Concerns of Survey Research

Measurement, selection, sampling, frame, and non-response errors were controlled. Direct route inference was employed in a census of vocational horticulture teachers with one or more years of teaching experience during the 1984-85 school year. A complete frame was arrived at through input from state supervisory staff. Appropriate follow-up procedures during data collection and a comparison of late and early respondents controlled non-response error. The variables on which late respondents were compared to early respondents were attitude of the teacher toward SOE, teacher perceptions of their SOE knowledge, and teacher perceptions of administrator support for SOE.

## Data Analysis

Data pertaining to teachers in the study were summarized with descriptive statistics. Although the entire population was included in the study, the data collected were considered representative of a sample in time. The relationships between SOE quality and the teacher presage variables were determined through calculation of Pearson product moment correlation coefficients and Spearman rank order correlation coefficients.

Scattergrams were examined to verify that the assumptions of linearity and homoscedasticity had not been violated. The relationships appeared to be linear and homoscedastic. Indices of predictive efficiency were calculated to determine the amount of variance in SOE quality that could be explained by each of the independent variables.

Analyses of variance were employed to further analyze the data. Normality, random sampling, homogeneity of variance, and independence of observations assumptions were met. The alpha level was established a priori at the .05 level.

## RESULTS

A summary of questionnaire returns is presented in Table 1. The number of questionnaires returned from 90 teachers was 85 (94.4 percent). Special needs horticulture teachers returned 7 (7.8 percent) questionnaires, while those teachers in regular horticulture programs returned 78 (86.7 percent) questionnaires. Population usable data were comprised of 84 (93.3 percent) questionnaires.

### Characteristics of Respondents

Table 2 presents data on the years of horticulture teaching experience of the respondents. Findings indicated that the majority of teachers (87 percent) had taught for five or more years.

The most frequently reported method of certification was Bachelor of Science degree in Agricultural Education or Agricultural Education/Horticulture. However, the majority (58 percent) of teachers were certified via the remaining alternatives. These data are presented in Table 3.

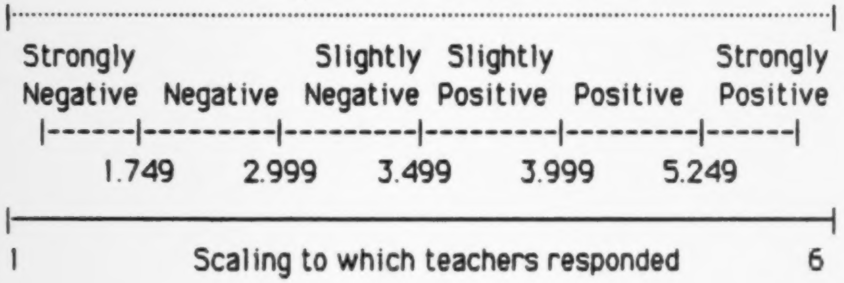
Table 4 shows that the majority of teachers (69 percent) had taken no vocational agriculture as high school students. Similarly, the majority of teachers (76 percent) had not conducted an SOEP while in high school (Table 5).

## The Relationships Between SOE Quality and Selected Teacher Presage Variables

The grand mean SOE quality score was 50.56 with a standard deviation of 9.47. The range of scores was 34 with 34 the minimum and 67 the maximum.

Respondents indicated their degree of agreement with each of the items regarding attitude toward SOE, perceptions of SOE knowledge, and perceptions of administrator support for SOE on the following Likert-type scale: (1) strongly disagree; (2) disagree; (3) slightly disagree; (4) slightly agree; (5) agree; and (6) strongly agree. The resulting mean scores were interpreted using the values shown on the researcher-devised scale that follows:

Scaling used to interpret results



Scaling to which teachers responded

The grand means of SOE attitude, perceptions of teachers of their SOE knowledge, and support of administrators for SOE as perceived by teachers were 4.61, 4.39, and 3.71 respectively. Attitudes of the teachers toward SOE and teachers perceptions of their SOE knowledge were positive while perceptions of teachers of the support of their administrators for SOE were only slightly positive.

Measures of association between SOE quality and the seven teacher presage variables were either negligible or low. These relationships are summarized in Table 6. Calculations of indices of predictive efficiency for the relationships between SOE quality and teacher presage variables showed that attitude of the teacher toward SOE and the additional six presage variables explained little or no variance in the dependent measure (Table 7). One-way analyses of variance were used to further analyze SOE quality by each of the teacher presage variables. In all cases, there were no significant differences in SOE quality among any of the groupings for each of the seven presage variables at the .05 level.

## CONCLUSIONS

The following conclusions were derived from the study:

1. Horticulture teachers were experienced and tended to remain in the profession beyond five years.
2. The option by which the horticulture teachers were certified was likely to be an alternative other than a B.S. degree with an agricultural education major.
3. Horticulture teachers were not likely to have had vocational agriculture in high school.
4. Horticulture teachers were not likely to have conducted an SOEP while in high school.
5. The main independent variable in the study, attitude of the teacher toward SOE, was a poor indicator of SOE quality. Similarly, the remaining alternative independent variables were also poor indicators of SOE quality.

## RECOMMENDATIONS

The following recommendations were made based upon the findings of the study:

1. Additional teacher presage variables should be investigated in relation to SOE quality.
2. A scholarly endeavor should be undertaken to develop paradigms for investigating SOE quality.
3. A study should be conducted in which the SOE knowledge of teachers was cognitively tested and used as a correlate to SOE quality.
4. Further SOE research is warranted in the other taxonomy areas of agricultural education, e.g., agricultural sales, and forestry.
5. The method of paired comparisons be used further in agricultural education research, particularly when investigating those problems where quantification is difficult.

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Table 1
Frequency and Percentage of Questionnaires Returned
by Type of Horticulture Program
(N=94)

| | Questionnaires | | | | | |
|---|---|---|---|---|---|---|
| | Mailed | | Returned* | | Usable | |
| Type of Program | f | % | f | % | f | % |
| Special Needs | 8 | 8.5 | 7 | 7.8 | 7 | 7.8 |
| Regular | 86 | 91.5 | 78 | 86.7 | 77 | 85.6 |
| TOTAL | 94 | 100.0 | 85 | 94.5 | 84 | 93.4 |

* Percentages based on N=90; four teachers were reported to be no longer teaching.

Table 2
Frequencies and Percentages of Respondents by Type of Horticulture
Program and Years of Horticulture Teaching Experience
(N=84)

| | Years of Horticulture Teaching Experience | | | | | |
|---|---|---|---|---|---|---|
| Type of Horticulture | 1-3 Yrs | | 3-5 Yrs | | 5 or More Years | |
| Program | f | % | f | % | f | % |
| Special Needs | 1 | 1.2 | – | – | 6 | 7.1 |
| Regular | 5 | 5.9 | 5 | 5.9 | 67 | 80.0 |
| TOTALS | 6 | 7.1 | 5 | 5.9 | 73 | 87.1 |

### Table 3
### Frequencies and Percentages of Respondents by Type of Horticulture Program and Method of Certification
### (N=84)

| Type of Horticulture Program | Method of Certification | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Industry[1] | | Associate[2] | | BS/Ag[3] | | BS/Ag Ed[4] | |
| | f | % | f | % | f | % | f | % |
| Special Needs | 2 | 2.4 | – | – | 3 | 3.6 | 2 | 2.4 |
| Regular | 15 | 17.9 | 8 | 9.5 | 21 | 25.0 | 33 | 39.3 |
| TOTALS | 17 | 20.3 | 8 | 9.5 | 24 | 28.6 | 35 | 41.7 |

1=At least 7 years of industry experience (completed or enrolled in 24-hour certification program)

2=Associate Degree (completed or enrolled in 24-hour certification program)

3=B.S. in Agriculture (Major in Horticulture; completed or enrolled in 24-hour certification program)

4=B.S. in Agriculture (Major in Agricultural Education and/or Horticulture; completed or enrolled in 24-hour certification program)

Table 4
Frequencies and Percentages of Respondents by Type of Horticulture Program and Number of Years the Teachers Had Vocational Agriculture as High School Students
(N=84)

| Type of Horticulture Program | Years of Vocational Agriculture in High School | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | | 1 | | 2 | | 3 | | 4 or More | |
| | f | % | f | % | f | % | f | % | f | % |
| Special Needs | 5 | 6.0 | _ | _ | _ | _ | _ | _ | 2 | 2.4 |
| Regular | 53 | 63.1 | 1 | 1.2 | 7 | 8.3 | 7 | 8.3 | 9 | 10.7 |
| TOTALS | 58 | 69.1 | 1 | 1.2 | 7 | 8.3 | 7 | 8.3 | 11 | 13.1 |

Table 5
Frequencies and Percentages of Respondents by Type of Horticulture Program and Number of Years an SOEP Was Conducted in High School
(N=84)

| Type of Horticulture Program | Number of Years an SOEP Was Conducted While in High School | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | | 1 | | 2 | | 3 | | 4 or More | |
| | f | % | f | % | f | % | f | % | f | % |
| Special Needs | 5 | 6.0 | _ | _ | _ | _ | _ | _ | 2 | 2.4 |
| Regular | 59 | 70.0 | 1 | 1.2 | 5 | 6.0 | 5 | 6.0 | 7 | 8.3 |
| TOTALS | *64 | 76.0 | 1 | 1.2 | 5 | 6.0 | 5 | 6.0 | 9 | 10.7 |

*Frequency included the 58 teachers who had not taken vocational agriculture in high school.

Table 6
The Relationships Between SOE Quality and Selected Teacher Presage Variables
(N=77)

| Relationship | Coefficient |
|---|---|
| SOE Quality/Attitude of the Teacher Toward SOE | $r = -.02$ |
| SOE Quality/Perceptions of the Teachers of Their SOE Knowledge | $r = .06$ |
| SOE Quality/Support of Administrators for SOE as Perceived by Teachers | $r = .09$ |
| SOE Quality/Length of Teaching Experience | $r_{ranks} = -.09$ |
| SOE Quality/Method of Certification of the Horticulture Teacher | $r_{ranks} = .08$ |
| SOE Quality/Number of Years the Teacher Had Taken Vocational Agriculture in High School | $r_{ranks} = .18$ |
| SOE Quality/Number of Years the Teacher Conducted an SOEP While in High School | $r_{ranks} = .09$ |

Table 7
Indices of Predictive Efficiency for Teacher Presage Variables
(N=77)

| Variable | Index of Predictive Efficiency | % Variance Explained |
|---|---|---|
| Attitude of the Teacher Toward SOE | .0002 | 0 |
| Perceptions of Teachers of Their SOE Knowledge | .0018 | 0 |
| Support of Administrators for SOE as Perceived by Teachers | .0041 | 0 |
| Length of Teaching Experience | .0041 | 0 |
| Method of Certification of the Vocational Horticulture Teacher | .0032 | 0 |
| Number of Years the Teacher Had Vocational Agriculture in High School | .0163 | 1-2 |
| Number of Years the Teacher Conducted an SOEP as a High School Student | .0182 | 1-2 |

# PROFESSIONAL ROLE PERCEPTIONS HELD BY TWO SELECTED GROUPS OF VOCATIONAL AGRICULTURAL TEACHERS IN MICHIGAN

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# PROFESSIONAL ROLE PERCEPTIONS HELD BY TWO SELECTED GROUPS OF VOCATIONAL AGRICULTURAL TEACHERS IN MICHIGAN

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## INTRODUCTION

Agricultural Education at the secondary level has evolved from teaching farm boys how to produce crops and livestock to teaching both girls and boys about agricultural technology and its application in an aggressive and changing society. Technological innovations, structural changes, local/state demands, and the community-involvement concept have brought about changes in the role of the vocational agricultural teacher. Drake (1962, p. 1) indicated that:

> If vocational agriculture programs are to meet adequately the changing demands for education in agriculture, the role of the teacher of vocational agriculture must be clearly identified and understood by himself as well as by the persons giving him direction in his professional activities.

The behavior of an individual cannot be understood when studied in a vacuum. Individual behavior is better understood when it is studied in the context of its relationship and interaction with groups and the environment. Guba and Getzel (1957), Parsons and Shils (1962), Katz and Khan (1966) indicate that individuals belong to a variety of social sets and each social set determines the normative behavior for that group. According to Lewin (1948) and Maslow (1954), when the expectations of the group are in conflict with the goals and needs disposition of the individual, role conflict is experienced. McComas (1962), and Bible and McComas (1963) indicate that there is a relationship between role consensus and effectiveness of the teacher. The latter also indicate that teachers' perception of their role responsibilities will have a direct effect on the performance of their role. Teachers, the focal group of this study, tend not to perform those activities that they perceive in a negative light.

## PURPOSES AND OBJECTIVES OF THE STUDY

The purposes of this study were to (a) identify and analyze the role perceptions held by two groups of vocational agriculture teachers; (b) determine if role perceptions held by either group differed significantly from those of others (viz., state department personnel and teacher educators); (c) analyze role execution; (d) analyze time allocation to each program area; and (e) analyze the importance attached to each area.

Specific objectives included the following:

1. To determine if production agriculture teachers have different role perceptions than ornamental horticulture teachers;

2. To determine if production agriculture teachers differ from ornamental horticulture teachers in the execution of selected role activities;

3. To determine if production agriculture teachers and ornamental horticulture teachers differ in the amount of time they allocate to each program area;

4. To determine if differences exist between production agriculture and ornamental horticulture teachers concerning the importance they attach to each program area; and

5. To determinine if production agriculture and ornamental horticulture teachers have different role perceptions, role execution, and time allocations for each program area with respect to teacher characteristics (sex, age, teaching experience, and degree earned) and school characteristics (enrollment, type and school community classification).

## METHODOLOGY

The population consisted of 128 production agriculture teachers and 37 ornamental horticulture teachers, all receiving added cost funding. A stratified sampling procedure was used to randomly select 59 production agriculture teachers. All 37 horticulture teachers were selected.

After a literature review, the researcher identified 102 role activities that were then subdivided into eight role categories. These categories were then reviewed by a panel of teacher educators and pilot tested by eight teachers not included in the sample.

The final draft of the survey instrument included 80 role activities and eight role categories: planning and implementing the secondary instructional program, advising youth organizations, supervising occupational experience programs, providing guidance and counseling, conducting adult instructional programs, educational leadership status in the community, membership on a professional staff, and membership in the profession. The instrument was designed to facilitate collecting data about role perception, role execution, time allocation and importance attached to each program area. Data concerning role perception were collected using a five-point Likert scale while a three-point scale produced the data about role execution. Data about time allocation were collected by having the respondents write their preference for each area. Data about importance attached were collected by having respondents indicate their preference on a four-point scale. A post hoc reliability test was conducted using Cronbach's Alpha. The reliability coefficients were 0.96 for role perception and 0.93 for role execution.

In all, 78 percent of the sample responded, providing 74 usable instruments. Subsequent telephone calls to non-respondents indicated they were not different from the respondents. All data were collected during the winter of 1985.

The Statistical Package for the Social Sciences was used to analyze the data at the Michigan State University Computer Center. Data about role perception, role execution, and time allocation were analyzed by multivariate analysis of variance (one-way, two-way) and univariate analysis of variance. Data about importance attached to each program were analyzed by comparing means.

## RESULTS

### Role Perception

Multivariate analysis of variance (one-way) indicated there was a significant difference between production agriculture and ornamental horticulture teachers (see Table 1). Univariate analysis then showed that the major areas of difference were in advising youth organizations and serving as an educational leader in the community. A subsequent examination of the means indicated that production agriculture teachers had a mean of 4.48 for advising youth organizations while the mean for horticulture teachers was 3.16. Production teachers also had the highest mean for serving as educational leaders in the community (3.98 vs. 3.61 for horticulture teachers).

Multivariate analysis of variance (two-way) indicated a significant effect for both teacher and school characteristics. Table 2 contains the probability data indicating statistically significant differences taken from all two-way MANOVA Tests and Univariate F-Tests used to analyze both sets of characteristics.

### Role Execution

Multivariate analysis of variance (one-way) indicated a significant difference between production agriculture and

Table 1

One-Way Multivariate Analysis of Variance

| Effect | F | df | Significance of F | Test Name |
|---|---|---|---|---|
| Main Effect (Teacher Type) Role Perception | 10.27181 | 8.65 | 0* | Wilks |
| Main Effect (Teacher Type) Role Execution | 10.66730 | 8.65 | 0* | Wilks |
| Main Effect (Teacher Type) Time Allocation | 9.35309 | 9.50 | .0036* | Wilks |

*Significant at Alpha <.05

ornamental horticulture teachers concerning their role execution (see Table 1). Univariate analysis indicated these differences were in advising youth organizations, providing guidance and counseling, and conducting the adult instructional program. An examination of the means for these areas showed that horticulture teachers performed youth organization activities more frequently (mean of 1.26) than did production teachers (mean of 1.05). It was also evident that production teachers performed activities associated with guidance and counseling and adult education more frequently than horticulture teachers. For guidance and counseling activities, the mean for production teachers was 1.98 while the mean for horticulture teachers was 1.62. The means for the adult instructional program were 2.57 for production teachers and 2.02 for horticulture teachers.

Multivariate analysis of variance (two-way) indicated there was a significant effect with respect to teacher and school characteristics. Table 2 shows the probability data indicating statistically significant differences taken from all two-way MANOVA Tests and the Univariate F-Tests used to analyze teacher and school characteristics.

## Time Allocation

Multivariate analysis of variance (one way) of time allocation indicated a significant difference between production and horticulture teachers (see Table 1). Univariate analysis showed that the major areas of difference were in advising youth organizations, providing guidance and counseling, and conducting the adult instructional program. Examination of the means for these items revealed that production teachers allocated more time for advising youth organizations (mean of 18.89%) than did horticulture teachers (mean of 2.50%). Horticulture teachers, however, allocated more time for guidance and counseling, and the adult instructional program (means of 11.5% and 4.0%, respectively). The means for production teachers in these areas were 5.31% and 0.71%, respectively.

Multivariate analysis of variance (two-way) indicated there was a significant effect with respect to teacher and school characteristics. Table 2 shows the probability data indicating statistically significant differences taken from all two-way MANOVA Tests and Univariate F-Test used to analyze teacher and school characteristics.

## Importance Attached

Data concerning importance attached to each program area were analyzed by comparing means. Those areas in which

Table 2. Significant probability data taken from all univariate F-tests concerning all dependent and independent variables with respect to role perception, role execution, and time allocation.

| Characteristic | Role Perception | | Role Execution | | | | Time Allocation | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Advis'g | C-Leader | Advis'g | SOEP | Guid'ce | Adult-E | Advis'g | Guid'ce | Adult Ed. | C-Leader | P-Staff | Prof'n |
| Sex | 0a | .04474a | .000177a | - | .00918a | | 0a | .00335a | .00508a | - | - | - |
| Age | .00012a | .03492a | .000176a | - | .00589a | .00028a | - | .02510c | .03120c | - | .01425c | .0003 |
| Degree Earned | 0a | .04546a | .00033a | - | .00775a | .00080a | 0a | .00307a | .00566a | - | - | - |
| Years Experience | 0a | .03754a | .0001a | - | .01166a | .00098a | 0a | .00364a | .00164a | - | - | - |
| Student Enroll. | 0a | - | .00094a | - | .00429a | .00025a | 0a | .00139a | .00330a | - | - | - |
| Type School | 0a | .03423a | - | .00240b | - | - | - | - | - | .02272b | - | - |
| School Community Classification | 0a | - | .00081a | - | .00413 | .00022a | - | - | .02620c | 0c | - | - |

Significant at Alpha <.05

Effect: [a]Main (Teacher Type)

[b]Main (Independent Variable)

[c]Interaction Effect

the means differed by 0.5 or more were considered to be significant.

The data indicated that the two groups of teachers differed with respect to advising youth organizations and supervising occupational experience programs: production teachers attached more importance to both areas. When the means were rank ordered, planning and implementing the secondary instructional program ranked number one while planning and implementing the adult instructional program ranked last. Table 3 contains the means for importance attached to each program area by position group.

## CONCLUSIONS

The conclusions of this study are based on an analysis of the data collected and a review of the literature.

1. The teachers' perceptions of their roles and responsibilities were consistent with how state department personnel and teacher educators viewed theirs with respect to teaching secondary students and school-related activities. Role activities directly related to teaching and the school were held in high esteem by all teachers, were conducted more often than any other role activity and consumed most of the teachers' work time.

2. Many activities viewed as "vocational" were held in low esteem, were conducted least often and consumed the least amount of the teachers' work time. For both groups, these included adult activities and community activities. For horticulture teachers, these included supervised occupational experience program and youth organization.

3. Teacher characteristics and/or school characteristics appear to influence three areas for both groups: role perceptions, role execution/performance and time allocated to each program area.

## RECOMMENDATIONS

The findings and conclusions of this study provided a basis for four recommendations concerning the vocational agriculture program.

1. Advising youth organizations should be reevaluated as a part of the horticulture program both by state and local program directors and by agriculture teacher educators at Michigan State University.

Table 3

Means for Importance Attached to Each Program Area by Position Group.

| Program Area | Ornamental N=27) | | Production (N=47) | |
|---|---|---|---|---|
| | Mean | S.D. | Mean | S.D. |
| Planning and implementing the instructional program for secondary students | 4.85 | .36 | 4.75 | .68 |
| Advising a vocationally related youth organization | 2.85 | 1.30 | 4.57 | .78 |
| Supervising occupational experiences of your students | 3.85 | .92 | 4.39 | .83 |
| Serving in guidance and counseling capacity for your students | 4.07 | .73 | 3.84 | .95 |
| Planning and implementing the adult instructional program | 2.81 | 1.41 | 3.84 | 1.06 |
| Working as an educational leader in the community | 3.77 | 1.21 | 3.70 | .99 |
| Working as a member of a professional staff | 4.15 | .77 | 3.98 | 1.08 |
| Working as a member of the profession | 4.12 | 1.03 | 4.07 | 1.12 |

2. If the youth-organization component of the vocational-agriculture program is to continue to be a part of the horticulture program, a strategy should be developed and implemented that would encourage and assist horticulture teachers with this phase of the program.

3. In-service and curriculum development should focus more on the supervised occupational-experience and community components of the vocational-agriculture program.

4. Incentives should be provided by state and local administrators to improve adult education activities deemed essential to the vocational-agriculture program and to the community.

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# PERCEPTIONS OF FORMER STATE FFA OFFICERS IN THE SOUTHERN REGION OF THE UNITED STATES TOWARD THE PROFESSION OF TEACHING VOCATIONAL AGRICULTURE

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## INTRODUCTION

The Future Farmers of America (FFA) is a national youth organization for students enrolled in vocational agriculture. The organization is designed to promote agriculture and to train leaders in the field of agriculture. Former state FFA officers should have the qualities which are necessary to be good vocational agriculture teachers. These former FFA members come from some of the best high school FFA chapters and could have a tremendous impact on young people by being vocational agriculture teachers. It is interesting, however, that there is a very small number of former state FFA officers who have become vocational agriculture teachers.

Agriculture is the number one industry in the United States and the need for highly skilled people to work in agriculture is increasing. Statistics from the School of Agriculture at Purdue University indicate that there will be a shortage of people with degrees in agriculture over the next few years (Goecker, 1980). If the field of agriculture will need more people to work in the future, there is an increased need for educating future leaders in agriculture in the secondary schools. Since the primary aim of the FFA is to develop and promote leadership, the former leaders of the organization could be the most instrumental people in directing students in the field of agriculture. There is a need for these former state FFA officers in the teaching field. A number of these state officers, in recent years, have enrolled in agricultural education programs at colleges and universities, but only seven out of the sixty North Carolina state FFA officers from 1971 to 1980 entered the work force as vocational agriculture teachers. This study is needed to determine the perception former state FFA officers have toward the profession of teaching vocational agriculture. Information gained through the study could possibly be utilized to encourage these qualified individuals to become teachers of vocational agriculture.

## PURPOSES AND OBJECTIVES

The purpose of this study was to determine why only a small percentage of the former state FFA officers from the Southern Region of the United States entered the profession of teaching vocational agriculture. More specifically, this study attempted to answer the following questions:

1. What are the perceptions of the former state FFA officers from the Southern Region of the United States toward the profession of teaching vocational agriculture?

2. Is there a significant difference between the perceptions of former state FFA officers from the Southern Region of the United States who are teaching vocational agriculture and those who are not teaching toward the profession of teaching vocational agriculture?

The information obtained from this study may help the vocational agriculture teachers enhance the image of their profession and may be used to encourage more people to enter the teaching profession as vocational agriculture teachers.

## METHODS AND PROCEDURES

This study was conducted using the former state FFA officers from eleven states in the Southern Region of the United States. Thirteen state agricultural education offices were contacted, but only eleven responded with a list of the names and addresses of their state FFA officers from 1971-1980. The eleven states were Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina and Tennessee. Texas and Virginia did not respond.

The population for this study consisted of 752 state FFA officers from the Southern Region of the United States from which a sample size of 246 was determined by the formula reported by Oliver and Hinkle, (1981). The sample was selected from the population by using a table of random numbers.

The instrument for this study was developed by evaluating an instrument which was used by Dr. Earl Webb and Dr. Jeffrey Moss at Texas A & M University. The instrument was sent to 25 randomly selected members of the population who were not selected as a part of the study sample. They were asked to review the instrument and make any comments or suggestions they felt would improve the survey instrument. Eighteen responses were received and only three indicated that they felt minor editorial changes were needed. The remaining respondents indicated that the instrument was clear, easy to understand and needed no changes. Content validity of the instrument was assumed based on the acceptance of the instrument by professional educators. Each of the subjects selected received a printed survey which was divided into two sections. One section contained questions to obtain demographic information. The second section of the survey asked the participants to indicate their perceptions of the profession of teaching vocational agriculture by responding to 15 selected statements. The surveys were mailed along with an addressed return envelope. The participants were asked to return the surveys within a three week period. A follow-up survey was sent to those who did not return the first survey. One hundred forty-three or 58.13% of the sample responded to these mailings. A ten percent sample of those who did not respond on either of the mailings was called and interviewed by phone. Statistical analysis indicated that the information obtained by phone was not significantly different from the information obtained by the written surveys. Therefore, these respondents were considered representative of the study sample. Including those surveyed by phone, 154 responses were obtained for a total of 62.60%.

TABLE 1

State of Residence, State FFA Office Held, and Year of State FFA Office Tenure

| Variable | Frequency | Percent |
|---|---|---|
| State | | |
| Alabama | 21 | 13.64 |
| Arkansas | 6 | 3.90 |
| Florida | 14 | 9.09 |
| Georgia | 23 | 14.94 |
| Kentucky | 18 | 11.68 |
| Louisiana | 7 | 4.55 |
| Mississippi | 4 | 2.59 |
| North Carolina | 15 | 9.74 |
| Oklahoma | 17 | 11.04 |
| South Carolina | 16 | 10.39 |
| Tennessee | 13 | 8.44 |
| Office | | |
| President | 23 | 14.93 |
| Vice-President | 66 | 42.85 |
| Secretary | 22 | 14.30 |
| Treasurer | 15 | 9.74 |
| Reporter | 13 | 8.44 |
| Sentinel | 15 | 9.74 |
| Year | | |
| 1971 | 10 | 6.49 |
| 1972 | 11 | 7.15 |
| 1973 | 10 | 6.49 |
| 1974 | 18 | 11.69 |
| 1975 | 12 | 7.79 |
| 1976 | 13 | 8.45 |
| 1977 | 17 | 11.03 |
| 1978 | 22 | 14.29 |
| 1979 | 23 | 14.93 |
| 1980 | 18 | 11.69 |

The null hypotheses for the study were analyzed using a Wilcoxon statistical analysis. The analysis was computed for the data using the Statistical Analysis System Procedure. The Wilcoxon Test performs analysis of variance on ranks and certain scores of a response across a one-way classification. The Statictical Analysis System Procedure used in this study is a non-parametric procedure for testing that the distribution of a variable is the same across different groups (SAS, 1982). The Wilcoxon uses ordinal dependent variables and categorical independent variables. The hypotheses were tested, using a two-tailed test, at an alpha level of .05.

## RESULTS

No significant differences were found in the perceptions of former state FFA officers who are currently teaching and those who are not teaching toward the adequacy of the job security, administrative support, advancement opportunity, community support, working conditions, job satisfaction, sense of accomplishment, prestige in the community and working hours of vocational agriculture teachers. No significant differences were found in the two groups' perceptions toward the statements; a desire to work with the FFA, a desire to work with young people and personal interest in vocational agriculture causes some people to become vocational agriculture teachers.

Significant differences were found in the perceptions of former state FFA officers who are teaching and those who are not teaching toward the stress level ($z=4.818$, $p=.000$), discipline problems ($z=2.657$, $p=.007$), and the adequacy of salaries vocational agriculture teachers receive ($z=2.243$, $p=0.24$).

The former state FFA officers perceive that vocational agriculture teachers' salaries are not adequate and that vocational agriculture teachers do not receive adequate support from the school administration. The teaching group perceived teaching vocational agriculture as a very stressful occupation while the non-teaching group indicated they perceived teaching vocational agriculture as a less stressful occupation than the teaching group.

The teaching group and the non-teaching group agreed that some people become vocational agriculture teachers because of their interest in vocational agriculture and a desire to work with young people and the FFA. Both groups agreed that vocational agriculture teachers have prestige in their communities and they have a high sense of accomplishment on their jobs. The teaching group felt that they did not have good working hours and that vocational agriculture teachers have more than a few discipline problems. The non-teaching group felt that the vocational

TABLE 2

Mean Scores and Standard Deviation for Statements Measuring Perceptions Toward the Profession of Teaching Vocational Agriculture

| Statement | Mean Scores[a] Teaching | SD | Non-Teaching | SD |
|---|---|---|---|---|
| 1. Vocational agriculture teachers receive a fair and adequate salary. | 2.16 | 1.06 | 2.66 | 1.02 |
| 2. Vocational agriculture teachers have adequate job security. | 3.72 | 0.61 | 3.34 | 0.99 |
| 3. Vocational agriculture teachers have prestige in their communities. | 3.80 | 0.76 | 3.68 | 0.80 |
| 4. Vocational agriculture teachers have good working hours. | 2.52 | 1.15 | 3.03 | 1.15 |
| 5. A desire to work with young people causes some people to become vocational agriculture teachers. | 4.24 | 0.72 | 4.08 | 0.76 |
| 6. Vocational agriculture teachers have good working conditions. | 3.36 | 0.99 | 3.37 | 0.82 |
| 7. Vocational agriculture teachers have a high sense of accomplishment on their jobs. | 3.84 | 0.74 | 3.67 | 0.83 |
| 8. Vocational agriculture teachers have adequate opportunity for career advancement. | 2.32 | 0.90 | 2.65 | 1.00 |
| 9. Teaching vocational agriculture is not a very stressful occupation. | 1.56 | 0.65 | 2.61 | 1.01 |
| 10. Vocational agriculture teachers have very few discipline problems. | 3.16 | 1.02 | 2.52 | 1.05 |
| 11. Some people become vocational agriculture teachers because of their own interest in vocational agriculture. | 4.04 | 0.61 | 4.13 | 0.78 |
| 12. Vocational agriculture teachers receive adequate support from the community. | 3.52 | 0.87 | 3.27 | 0.86 |
| 13. Vocational agriculture teachers receive adequate support from their school administrators. | 2.92 | 1.18 | 2.78 | 0.96 |
| 14. Vocational agriculture teachers are satisfied with their jobs. | 3.24 | 0.92 | 3.31 | 0.73 |
| 15. A desire to work with the FFA causes some people to become vocational agriculture teachers. | 4.08 | 0.90 | 4.02 | 0.79 |

[a] Note: 1 = Strongly Disagree 2 = Disagree 3 = Undecided
4 = Agree 5 = Strongly Agree

TABLE 3

Results of Wilcoxon Analysis for the Association Between Teaching Experience in Vocational Agriculture and Perceptions Toward The Profession of Teaching Vocational Agriculture

| Statement | Group | N | Mean(a) | SD | Wilcoxon Analysis<br>Z value | <br>p value |
|---|---|---|---|---|---|---|
| 1 | Teaching | 25 | 2.16 | 1.06 | 2.243 | .024 * |
| | Non-teaching | 129 | 2.66 | 1.02 | | |
| 2 | Teaching | 25 | 3.72 | 0.61 | 1.761 | .078 |
| | Non-teaching | 129 | 3.34 | 0.99 | | |
| 3 | Teaching | 25 | 3.80 | 0.76 | .602 | .547 |
| | Non-teaching | 129 | 3.68 | 0.80 | | |
| 4 | Teaching | 25 | 2.52 | 1.15 | 1.882 | .059 |
| | Non-teaching | 129 | 3.03 | 1.15 | | |
| 5 | Teaching | 25 | 4.24 | 0.72 | 1.024 | .305 |
| | Non-teaching | 129 | 4.08 | 0.76 | | |
| 6 | Teaching | 25 | 3.36 | 0.99 | .513 | .607 |
| | Non-teaching | 129 | 3.37 | 0.82 | | |
| 7 | Teaching | 25 | 3.84 | 0.74 | .848 | .396 |
| | Non-teaching | 129 | 3.67 | 0.83 | | |
| 8 | Teaching | 25 | 2.32 | 0.90 | 1.479 | .139 |
| | Non-teaching | 129 | 2.65 | 1.00 | | |
| 9 | Teaching | 25 | 1.56 | 0.65 | 4.818 | .000 ** |
| | Non-teaching | 129 | 2.61 | 1.01 | | |
| 10 | Teaching | 25 | 3.16 | 1.02 | 2.657 | .007 ** |
| | Non-teaching | 129 | 2.52 | 1.05 | | |
| 11 | Teaching | 25 | 4.04 | 0.61 | .974 | .329 |
| | Non-teaching | 129 | 4.13 | 0.78 | | |
| 12 | Teaching | 25 | 3.52 | 0.87 | 1.468 | .142 |
| | Non-teaching | 129 | 3.27 | 0.86 | | |
| 13 | Teaching | 25 | 2.92 | 1.18 | .706 | .480 |
| | Non-teaching | 129 | 2.78 | 0.96 | | |
| 14 | Teaching | 25 | 3.24 | 0.92 | .077 | .938 |
| | Non-teaching | 129 | 3.31 | 0.73 | | |
| 15 | Teaching | 25 | 4.08 | 0.90 | .669 | .503 |
| | Non-teaching | 129 | 4.02 | 0.79 | | |

* $p < .05$, ** $p < .01$

(a) 1 = Strongly disagree 2 = Disagree 3 = Undecided 4 = Agree 5 = Strongly agree

agriculture teachers' working hours were good and they perceived that discipline problems are worse than the teaching group indicated.

The non-teaching and the teaching group were undecided in their perceptions toward the vocational agriculture teachers' working conditions and job satisfaction. The teaching group felt that their job security was adequate.

Most of the former state FFA officers from the Southern Region of the United States have at least a bachelor's degree and 16.24% of the former state FFA officers have chosen teaching vocational agriculture as a career.

## Conclusions

The following conclusions were formulated as a result of the findings of this study:

1. Although both groups felt that vocational agriculture teachers' salaries are inadequate, there was a significant difference between the perceptions of the teaching group and the non-teaching groups toward the adequacy of the salaries vocational agriculture teachers receive.

2. Both the teaching and non-teaching groups perceived the job security of vocational agriculture teachers as adequate.

3. The teachers and non-teachers felt that vocational agriculture teachers have prestige in their communities.

4. The former state FFA officers who were not teachers indicated they felt the teacher's working hours were better than what the teachers indicated.

5. The teaching and non-teaching groups perceived working with young people as a reason some people become vocational agriculture teachers.

6. Both groups were undecided about their perceptions toward the working conditions of vocational agriculture teachers.

7. Both groups, teaching and non-teaching, of the former state FFA officers perceived, that vocational agriculture teachers have a high sense of accomplishment on their jobs.

8. Both groups, teaching and non-teaching, perceived vocational agriculture teachers' advancement opportunities to be inadequate.

9. Non-teachers perceived teaching vocational agriculture as a less stressful occupation than the teachers indicated while teachers perceived that teaching vocational agriculture is very stressful.

10. Vocational agriculture teachers felt that they had fewer discipline problems than the non-teaching group who felt that discipline problems were more numerous.

11. Both the teaching and non-teaching groups perceived that a desire to work with the FFA causes some people to become vocational agriculture teachers.

12. Both groups felt that vocational agriculture teachers receive adequate support from the community.

13. Both the teaching and non-teaching groups perceived the support vocational agriculture teachers receive from their school administrators as inadequate.

14. Both groups were undecided about their perceptions toward vocational agriculture teachers' job satisfaction.

15. The teaching and non-teaching groups perceived that a desire to work with the FFA causes some people to become vocational agriculture teachers.

## Recommendations

Based on the findings and conclusions of this study, the following implications and recommendations are suggested:

1. Steps should be taken to increase the salaries for teachers of vocational agriculture, in order to encourage more people to become vocational agriculture teachers.

2. Measures should be taken to improve the working hours of vocational agriculture teachers.

3. Steps should be taken to enhance the advancement opportunities for vocational agriculture teachers.

4. Steps should be taken to foster better support and relationships between school administrators and vocational agriculture teachers.

5. Measures should be take to reduce the stress level of teaching vocational agriculture.

6. Measures should be taken to improve the working conditions, discipline problems, community support and job satisfaction of vocational agriculture teachers.

7. Steps should be taken to insure that factors of adequate job security, prestige in the community, and a high sense of accomplishment on the job remain positive.

8. Measures should be taken to preserve the attitudes that some people become vocational agriculture teachers because of their own interest in vocational agriculture and their desire to work with young people and the FFA.

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# STATUS OF ADULT AGRICULTURAL EDUCATION DELIVERY SYSTEMS AND PROGRAMS IN SELECTED OHIO COUNTIES

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## INTRODUCTION

Understanding the needs of adults in agriculture has been very critical to the proper selection of programs, methods, and relevant subject matter for the development of effective educational programs. An accurate assessment of needs and interest through a needs assessment is essential to the formulation of curricula for educational programs (Hunsicker, 1974). Boulmetis (1981) stated that one of the keys to success of any delivery system is how accurately the needs of the participants have been identified and are subsequently met.

In the United States, adult agricultural education is offered by a wide variety of agencies (Knowles, 1969). Although each agency tries to serve a selected population, there is considerable overlap of services and activities (Marshall, 1978). If educational planners were to communicate their offerings and services, the programs in adult agricultural education could improve, since duplication of services might be reduced (Hilton, 1979).

By identifying the deliverers of agricultural education for adults, the clientele which is served, and their respective needs; educational planners will better be able to develop programs which reflect the projected educational needs of farmers and agribusiness personnel in the future. In turn, through articulation between educational planners of various purveyors of education, duplication of services should be reduced and ultimately avoided (Hilton, 1979).

## OBJECTIVES OF THE STUDY

The purpose of this study was to determine the status of the current efforts in delivering adult agricultural education by vocational agriculture, Cooperative Extension Service, and the agribusinesses in order to propose alternative educational delivery systems.

The objectives of this portion of the study were to:

1. determine the status of adult education offerings in agriculture by the Ohio Cooperative Extension Service, public

schools (high schools, technical institutions, and Ohio State University resident instruction), and related agencies;

2. determine why adult education programs are not offered by some school systems;

3. ascertain the needs for adult education programs in agriculture; and,

4. project the number of persons who would participate in adult education programs in agriculture.

## METHODS AND PROCEDURES

### Population and Sample

The population for this study consisted of all farmers and agribusinesses in Clark and Knox County, Ohio. A random sampling of farmers (n=185) and agribusinesses (n=154) was obtained. A census was used from the public school teachers of agriculture (N=18) and from the county extension agents (N=6) in the selected counties.

One hundred eighty-five farmers were asked to participate in the study. Usable responses were received from 84 farmers for a 45.4 percent response rate. One hundred fifty-four agribusinesses were asked to participate in the study. Usable responses were received from 42 agribusinesses for a 27.3 percent response rate.

### Design of the Study

This study employed survey research methodologies.

### Instrumentation

Researcher-developed mailed questionnaires and supplemental personal interview schedules were the instruments used in the process of data collection. The mailed questionnaires consisted of two parts: Part I solicited answers to demographic characteristics while Part II sought answers to the respondents' perceived educational needs.

The instruments used to collect the data were validated by a panel of experts. The reliability for the farmers' questionnaire was =.88, and for the agribusinesses was =.81, with Cronbach's Alpha.

The process of triangulation was used to obtain richer information on the agribusiness subjects from personal interviews. A random sample of twenty percent of the subjects was chosen.

### Data Collection

Data were collected by mailed questionnaire and a supplemental personal interview. The original mailing generated 67 responses

(36.8 percent) from the farmers and 36 responses (23.4 percent) from the agribusinesses. Non-respondents were followed-up with the mailing of a complete package which generated and additional 20 responses from the farmers and 13 additional responses from the agribusinesses. A third mailing was completed for the non-respondent farmers which generated an additional 13 responses. The total respondents for this study were 100 farmers (54.1 percent) and 49 agribusinesses (31.8 percent). Sixteen farmer questionnaires were found to be unusable as were seven agribusiness questionnaires. Thus, the responding sample was 84 farmers (45.4 percent) and 42 agribusinesses (27.3 percent). A random sample of ten percent of the non-respondent farmers and agribusinesses were obtained and personal interviews were conducted. No significant differences were noted between the respondent and non-respondent farmers and the respondent and non-respondent agribusinesses.

## RESULTS: FINDINGS, CONCLUSIONS, RECOMMENDATIONS

### Description of Sample

The typical farmer in this study was a male who had been engaged in the farming profession an average of 22 years. Likewise, the typical agribusiness owner/manager was a male who had been in the agribusiness profession an average of 19 years. Forty-three percent of the farmers reported attaining some education beyond the high school diploma. The agribusiness owners/mangers reported that 73 percent had received some education beyond the high school diploma.

### Status of Adult Education Offerings in Agriculture

Table 1 shows that the overwhelming majority of farmers (74.0 percent) have personally participated in adult education classes in agriculture. Of the agribusiness owners/mangers 60 percent reported that they had enrolled in adult education classes in agriculture as a participant.

Table 1

Previous Enrollment in Adult Education Classes

| | Enrolled | | Not Enrolled | |
|---|---|---|---|---|
| Type of Respondent | f | % | f | % |
| Farmer | 57 | 74.0 | 20 | 26.0 |
| Agribusiness Manager/ Owner | 24 | 60.0 | 16 | 40.0 |

Missing Data: Farmers=7 Agribusiness=2

In regards to which agency should provide the educational services to the farmers, the Cooperative Extension Service was ranked by farmers as the most important agency (Table 2). The agribusinesses were ranked the lowest on importance of who should provide educational services to farmers. A numerical ranking of one to six was used with number one being felt most important to provide educational services to farmers and six being felt least important.

Table 2

Ranking of Agencies Which Should Provide Educational Service to Farmers

| Agency | Mean | SD |
|---|---|---|
| Ohio Cooperative Extension Service | 2.49 | 1.60 |
| Joint Vocational Schools | 3.39 | 1.54 |
| Colleges and Universities | 3.43 | 1.68 |
| High Schools | 3.78 | 1.93 |
| Technical Schools | 3.96 | 1.29 |
| Agribusinesses | 3.97 | 1.73 |

Tables 3 and 4 present findings on the ranking of agencies that agribusiness owners/mangers felt should provide educational service to their employees and to them respectively. A numerical ranking of one to six was used with one being felt the most important to provide educational services to employees and the owners/managers and six being felt the least important to provide educational services to employees and the owners/managers. Agribusiness managers/owners indicated that Joint Vocational Schools should provide educational services to their employees and that product line companies (John Deere, Dekalb, Marathon) should provide educational services to them (Tables 3 and 4). Table 3 and Table 4 also show that agribusiness managers/owners felt that high schools were the least important agency that should provide educational services to them and their employees.

Table 3

Ranking of Agencies Which Should Provide Educational Services to Agribusiness Employees

| Agency | Mean | SD |
|---|---|---|
| Joint Vocational School | 2.95 | 1.39 |
| Ohio Cooperative Extension Service | 3.28 | 1.74 |
| Vocational Technical School | 3.43 | 1.46 |
| Product Line Companies | 3.50 | 2.12 |
| Colleges and Universities | 3.56 | 1.75 |
| High Schools | 3.74 | 1.84 |

Table 4

Ranking of Agencies Which Should Provide Educational Services to Agribusiness Owners/Managers

| Agency | Mean | SD |
|---|---|---|
| Product Line Companies | 2.56 | 1.84 |
| Colleges and Universities | 2.69 | 1.64 |
| Ohio Cooperative Extension Service | 2.89 | 1.58 |
| Joint Vocational Schools | 3.79 | 1.52 |
| Vocational Technical Schools | 3.82 | 1.33 |
| High Schools | 4.63 | 1.72 |

Through the use of personal interviews of 18 public school teachers and 6 county extension agents, 61.1 percent of the teachers reported that they should not be the purveyors of adult agricultural education classes, but that it should come from related agencies such as the Soil Conservation Service, Cooperative Extension Service, and the Agricultural Stabilization Conservation Service. Of the county extension agents interviewed, 58.3 percent felt that adult agricultural education classes should be conducted by the county agents.

Table 5 shows that high schools, followed by colleges and universities, were the educational systems which most often asked the opinion of the agribusiness owners/managers concerning the educational needs of their employees and of the owners/managers.

Table 5

Agencies Asking Opinion Agribusiness Educational Needs

| Agency | f | % |
|---|---|---|
| High Schools | 16 | 18.5 |
| Colleges and Universities | 14 | 16.1 |
| Ohio Cooperative Extension Service | 13 | 14.9 |
| Joint Vocational Schools | 13 | 14.9 |
| Product Line Companies | 12 | 13.8 |
| Other | 4 | 4.6 |
| Never Asked | 4 | 4.6 |
| Total | 87 | 100.0 |

Data on the types of educational agencies which have provided programs in which farmers have participated are reported on Table 6. Findings revealed that programs offered by agribusinesses and the Cooperative Extension Service were the most used.

Table 6

Farmer Participation In Adult Agricultural Education Programs

| Program Sponsor | f | % |
|---|---|---|
| Agribusinesses | 42 | 33.6 |
| Ohio Cooperative Extension Service | 37 | 29.6 |
| High School | 36 | 24.8 |
| Joint Vocational Schools | 10 | 8.0 |
| Industrial Technical Colleges | 3 | 2.4 |
| Industrial Technical Colleges (Part-time Classes) | 2 | 1.6 |
| Total | 125 | 100.0 |

Table 7 presents data on the types of public education training programs in which agribusiness owners/managers had participated. Findings revealed that programs offered by agribusinesses and the Ohio Cooperative Extension Service were the most used.

Table 7

Agribusiness Owners/Managers Participation In Adult Agricultural Education Programs

| Program Sponsor | f | % |
|---|---|---|
| Agribusinesses | 20 | 23.8 |
| Ohio Cooperative Extension Service | 19 | 22.6 |
| Colleges and Universities | 11 | 13.1 |
| Industrial Technical Colleges | 10 | 11.9 |
| Joint Vocational Schools | 9 | 10.7 |
| High Schools | 9 | 10.7 |
| Industrial Technical Colleges (Part-time Classes) | 6 | 7.2 |
| Total | 84 | 100.0 |

## Status of Adult Agricultural Education in Public Schools

Objective two of this study was to ascertain why adult education programs are not being offered by some school systems. Approximately 61 percent stated the primary reason for not offering adult education classes was that the classes were already being offered by other agencies (Table 8). The other reasons reported for not providing adult education clases were: take too much time (22.2 percent), lack of enrollment (12.3 percent), and not enough pay for the services (5.4 percent).

Table 8

Reasons Why Adult Agricultural Education Classes Are Not Offered By School Systems

| Reason | f | % |
|---|---|---|
| Classes offered by other agencies | 11 | 61.1 |
| Takes too much of my time | 4 | 22.2 |
| Lack of enrollment | 2 | 12.3 |
| Not enough pay for the services | 1 | 5.4 |
| Total | 18 | 100.0 |

## Need For Adult Education In Agriculture

The third objective of this study was to determine the needs for adult education programs in agriculture. Table 9 shows that approximately 75 percent of the farmers reported that there was a need for adult education classes in agriculture. Approximately 76 percent of the agribusiness owners/managers responded in favor of a need for adult education classes in agriculure.

Table 9

Need For Adult Education Classes In Agriculture

| | Felt Need | | No Felt Need | |
|---|---|---|---|---|
| Respondent | f | % | f | % |
| Farmers | 55 | 75.3 | 18 | 24.7 |
| Agribusiness | 29 | 76.3 | 9 | 23.7 |

Tables 10 and 11 present the mean and standard deviation scores to statements which ascertained the needs for adult education programs in agriculture to farmers and agribulsness owners/managers. A numerical rating scale was used for measurement of the precelved educational needs of the farmers and the agribusinesses. The scale for this study employed a rating system of does not apply (12), strongly agree (10), agree (9, 8, 7), slightly agree (6), slightly disagree (5), disagree (4, 3, 2), and strongly disagree (1).

Table 10

Farmers Agreement To Statements Regarding Adult Education In Agriculture

| Statement | | Mean | SD |
|---|---|---|---|
| 1. | I am never too old to learn. | 9.46 | 1.71 |
| 2. | Job becoming more complex | 8.84 | 2.32 |
| 3. | Need to be kept up-to-date | 8.42 | 2.69 |
| 4. | OCES programs highly beneficial | 8.33 | 2.54 |
| 5. | Take part yearly to stay current | 8.18 | 2.91 |
| 6. | Utilized OCES experts | 7.70 | 2.67 |
| 7. | Technical schools should have more beneficial classes | 7.61 | 2.50 |
| 8. | More time needed for social interaction at classes | 7.58 | 2.61 |
| 9. | OCES programs related to my needs | 7.45 | 2.72 |
| 10. | More time need for problem discussion during class time | 7.34 | 2.56 |
| 11. | Classes have helped me in the past | 7.30 | 3.58 |
| 12. | Plan to particpate during the next year | 7.29 | 3.46 |
| 13. | OCES should offer more programs in the local community | 7.28 | 2.54 |
| 14. | Classes are held at convenient locations | 7.13 | 3.05 |
| 15. | Know of classes offered by government agencies in community | 7.07 | 3.33 |
| 16. | Plan my schedule to allow time to attend classes | 6.95 | 2.87 |
| 17. | Colleges and universities should do more in the area of adult education | 6.75 | 3.00 |
| 18. | Willing to pay tuition and fees | 6.65 | 3.06 |
| 19. | OCES offers classes in my area | 6.54 | 3.57 |
| 20. | Classes offered at convenient times | 6.36 | 3.33 |
| 21. | Local high school should do more in the area of adult education | 6.25 | 3.00 |
| 22. | More one-to-one instruction is needed at my farm | 5.95 | 3.05 |
| 23. | High school is willing to offer more programs in adult education | 5.72 | 3.27 |

Table 11

Agribusiness Owners/Managers Agreement To Statements Regarding Adult Education In Agriculture

| Statement | Mean | SD |
|---|---|---|
| 1. Employees are never too old to learn | 9.53 | 1.27 |
| 2. Employees require constant participation in educational programs to remain current | 8.76 | 2.07 |
| 3. Employees need to know of technical advances in area of employment | 8.43 | 2.34 |
| 4. Employees should participate in adult education classes during the next year | 8.38 | 2.47 |
| 5. Technical schools should offer more classes | 8.34 | 2.40 |
| 6. Participation in adult education classes strengthens job security | 8.27 | 2.43 |
| 7. Jobs are becoming more complex | 8.27 | 2.62 |
| 8. Participation in adult education increases job advancement | 8.21 | 2.00 |
| 9. Four year colleges should offer more adult education classes | 8.11 | 2.63 |
| 10. Employees benefit from adult education classes | 8.00 | 2.48 |
| 11. Employees will be rewarded financially for participating | 7.97 | 2.44 |
| 12. Classes offered at convenient locations | 7.66 | 2.93 |
| 13. More time is needed for interaction at classes | 7.47 | 2.84 |
| 14. Employer should pay tuition and fees | 7.42 | 2.84 |
| 15. Employees have time to attend classes after working hours | 7.41 | 2.90 |
| 16. Classes offered at convenient times | 7.40 | 3.50 |
| 17. More time needed for social discussion during class time | 7.09 | 3.02 |
| 18. Employees should be provided time off to attend classes | 6.73 | 3.15 |
| 19. Local schools should provide more educational programs for adults | 6.43 | 3.13 |
| 20. Local schools willing to assist in educating employees | 6.34 | 4.08 |
| 21. Know of classes offered by government agencies in community | 6.23 | 4.25 |

Table 11 (continued)

Agribusiness Owners/Managers Agreement To Statements Regarding Adult Education In Agriculture

| Statement | Mean | SD |
|---|---|---|
| 22. More one-to-one instruction needed at my place of business | 6.19 | 3.30 |
| 23. Know of classes offered by Ohio State University, not part of the extension service | 6.12 | 4.53 |

## Projected Participation in Adult Education in Agriculture

The fourth objective of this study was to determine the number of persons who would participate in adult education programs in agriculture. Table 12 reports that approximately 65 percent of the farmers indicated that they plan to participate in adult agricultural education classes during the coming year. Likewise, approximately 70 percent of the agribusiness owners/mangers indicated that their employees would attend adult education classes if asked by the employer. The approximate percent of the agribusiness owners/managers who stated they would participate during the coming year was 62.

Table 12

Respondents Willing To Participate In Adult Education Classes During The Coming Year

| Respondent | Percent |
|---|---|
| Farmers | 64.8 |
| Agribusiness Employees | 70.2 |
| Agribusiness Owners/Managers | 62.1 |

## Conclusions

The following conclusions about objective one can be made.

1. The majority of the farmers and agribusiness owners/managers have participated in adult education classes in agriculture.
2. The Ohio Cooperative Extension Service is the agency perceived by farmers as the most important agency which should deliver adult education programs in agriculture to them and that agribusinesses should be the least important.

3. Agribusiness owners/managers reported that Joint Vocational Schools should be the most important purveyor of education for their employees and that high schools should be the least important.

4. Agribusiness owners/managers perceive that product line companies such as John Deere and Dekalb should be the most important deliverer of adult education programs in agriculture to them and that high schools should be the least important.

5. Public school teachers do not perceive themselves as the purveyors of adult education in agriculture.

6. County extension agents reported that the extension service should be the purveyor of adult education programs in agriculture.

7. High schools most often inquire of agribusiness owners/managers concerning their educational needs.

8. Farmers and agribusiness owners/managers most often participated in adult education programs in agriculture sponsored by agribusinesses and/or product line companies.

The following conclusions about objective two can be formulated.

1. The primary reason that teachers reported for not having adult education programs in agriculture was because the classes were already being offered by other agencies.

2. Other reasons that teachers reported for not having adult education programs in agriculture was because they take too much time, there is a lack of enrollment, and the teachers are not paid enough for the services.

The following conclusions about objective three can be drawn.

1. A large majority of the farmers and agribusiness owners/managers have a felt need for adult education programs in agriculture.

2. A need exists because respondents reported they are never too old to learn.

3. Jobs on the farm and at the places of business are becoming more complex.

4. Farmers and agribusiness owners/managers need to be kept up-to-date on new technology.

5. Participation in adult education programs in agriculture was perceived to strengthen job security.

6. Participation in adult education programs in agriculture was perceived to increase job advancement possibilities.

7. Financial rewards were perceived to be gained by those attending adult education programs in agriculture.

8. Farmers and agribusiness employers are willing to pay tuition and fees to attend adult education programs in agriculture.

9. Farmers, agribusiness employees, and agribusiness owners/managers benefit by attending adult education classes in agriculture.

10. Agribusiness owners/managers indicated that most employees need new knowledge and skills in agriculture.

The following conclusions about objective four were drawn from the data collected.

1. The majority of the farmers indicated that they plan to participate in adult education programs in agriculture during the coming year.

2. A large number of agribusiness employees would attend adult education classes in agriculture if asked by the employer.

3. The majority of agribusiness owners/managers stated that they plan to participate in adult education classes in agriculture during the coming year.

## Recommendations

1. The Ohio Cooperative Extension Service should serve as coordinator and facilitator of adult education programs in agriculture for the farmers.

2. Joint Vocational Schools should serve as coordinators and facilitators of adult education programs in agriculture for agribusiness employees.

3. Product line companies should serve as the purveyors of the educational needs of agribusiness owners/managers.

4. Product line companies should make a greater effort of soliciting the opinions of the agribusiness owners/managers regarding their educational needs.

5. Farmers are asking that the Ohio Cooperative Extension Service provide their educational needs, yet the farmers are participating in more of the programs offered by the agribusiness. More effort should be placed by the Ohio Cooperative Extension Service to provide programs that are relevant to the farmers' needs.

6. Public schools should offer alternative classes not being offered by other agencies in an effort to establish themselves in providing adult education programs in agriculture.

7. All public education institutions should make an effort to do more in the delivery of adult education programs in agriculture.

8. The Ohio Cooperative Extension Service should bring programs into the communities.

To achieve the portion of the purpose of this study of proposing alternative educational delivery systems, a commission will be formed to recommend guidelines for pilot efforts for the delivery of adult agriculture education. This segment of the total project will hopefully be carried out in the near future.

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# Agricultural Interests That Supported the Smith-Hughes Act with Implications for Today's Legislative Process

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# Agricultural Interests That Supported the Smith-Hughes Act with Implications for Today's Legislative Process

## INTRODUCTION/NEED FOR THE STUDY

A major three-part coalition was formed to support passage of the Smith-Hughes Act in 1917. Two parts of this coalition were represented by industry and labor interests. The third, and perhaps most important component of this coalition was the agricultural interests. Many historians and other experts on federal legislation believe the Smith-Hughes Act could not have been passed without support from the agricultural interests. As Wirth (1980) noted, "Without the powerful help of the farm interests, . . . it would probably have been impossible to marshal the coalition of votes that was required to pass the Smith-Lever and Smith-Hughes legislation." (p. 89). Major interests that formed the agricultural sector of the coalition included mass media in the form of magazines, agricultural organizations, and institutions of higher education.

In the early 20th century a most influential form of mass media representing agricultural interests was farm magazines. Editorials expressed by the magazines not only influenced farmers and leaders in rural communities, but also the citizens of the country who were dependent on an agriculturally based economy. The rural population represented 53.7% of the national population in 1910 (Swanson, 1951).

Agricultural or farm organizations who did not always agree on policy issues had to come to agreement on the specific issue of federal legislation supporting vocational education. They also had to learn to compromise naturally antagonistic positions before they could become a viable force in the coalition.

Institutions of higher education had to agree on turfmanship-type issues before they could become a viable part of the coalition. Land-grant universities and non land-grant universities and schools had to reach some type of agreement on the relationship between extension education and vocational education and the role to be played in vocational teacher education.

Many lessons can be learned from the coalition which supported the Smith-Hughes Act, because contemporary vocational educators face many of the same issues for obtaining passage of vocational legislation as their predecessors in the early 1900s. Agricultural education is still influential, but does not play the prominent role it once did in the legislative process. This is an opportune time to examine the original coalition established by agricultural interests and consider using it to influence federal legislation once again.

## PURPOSES AND OBJECTIVES

The purpose of the study was to examine and chronicle the various agricultural interests that supported passage of the Smith-Hughes Act during the period of the late 1800s through 1917. A secondary objective was to examine the historical events influencing decisions made by these agricultural interests. Specific objectives for the study were the following:

1. to name and describe the positions of the agricultural mass media interests that supported the Smith-Hughes Act;
2. to name and describe the positions of the agricultural organizations that supported the Smith-Hughes Act;
3. to name and describe the positions of the agricultural higher education interests that supported the Smith-Hughes Act;
4. to examine the issues faced by the agricultural interests who supported the Smith-Hughes Act; and
5. to identify implications from the coalition of agricultural interests which supported the Smith-Hughes Act for today's legislative process.

## METHODS AND PROCEDURES

Historical research methods were utilized to accomplish the objectives of the study. Both primary and secondary sources were utilized to obtain the information needed. Primary sources included mass media publications, minutes of Congressional committees, texts of federal legislation, and speeches given by prominent leaders. Secondary sources included United States Department of Agriculture publications, United States Office of Education publications, books, and journal articles. The references used were subjected to both internal and external criticism (Gay, 1976).

## RESULTS

### Mass Media

The most popular forms of mass media in the United States during the late 1800s and early 1900s were newspapers and magazines. Three agriculturally oriented magazines endorsed rural education reform, including support for vocational education.

## Hoard's Dairyman

William Dempster Hoard, editor of Hoard's Dairyman, viewed conservative educators as obstacles to change (Cremin, 1964). He noted in 1895 that rural schools had not changed in 60 years (Wirth, 1980). Through editorials Hoard endorsed the preparation of farmers through practical education. "The surest way in the world to build up and maintain a race of intelligent American farmers is to recruit them from the farm, and give them something to study in the country school that shall aid them in mastering farm problems." (Hoard, 1895, p. 419). He also encouraged a very practical curriculum where students would be taught, ". . . to care properly for the sacred gifts of God - the soil and the dumb animals." (Hoard, 1914, p. 416). Hoard's endorsements of practical rural education were most important because of his prominence as editor of an influential farm magazine, but also because he was a one time governor of Wisconsin and a member of the University of Wisconsin's Board of Regents (Cremin, 1961).

## Wallace's Farmer

Henry Wallace, editor of Wallace's Farmer, worked diligently on behalf of rural education (Cremin, 1961). Wallace (1908a) wrote "It is hard for many a middle-aged farmer to get a clear idea of what is meant by protein, carbohydrate, fats, nitrogen-free extract, etc. Now these terms are no harder than many which the pupils learn and which are of no earthly use to them in their every-day lives." (p. 338). Later in the same year (Wallace, 1908b) advocated using practical agricultural tools as teaching devices in school such as samples of corn, a Babcock milk tester, trees, and insects. Closer to the passage of the Smith-Hughes Act in 1914 Wallace advocated schools teaching local community corn acreage, pasture acreage, other grain acreage, and livestock populations such as cattle, hogs, sheep, and horses. He also emphasized the importance of practical instruction when he wrote (Wallace, 1914) "Our suspicion is that both in country and city schools the teachers do not get the fodder down low enough for the lambs, and that often it is not the best kind of fodder, and that a change would make the lambs more thrifty." (p. 1165)

## American Agriculturalist

Lakes (1986) reported that Herbert Myrick, first president of the National League for Industrial Education, ". . . used the pages of his American Agriculturalist to further the cause for rural education and country life reform" (p. 43). While not having the influence of either Hoard's Dairyman or Wallace's Farmer, this third mass media publication supported passage of vocational legislation where none had existed before and assisted in facilitating the process.

## Agricultural Organizations

Several agricultural organizations put aside typical competitive instincts when they supported vocational education. They provided such support by passing resolutions, through their leaders' speeches, and by lobbying politicians.

### Farmers Union

In a 1909 publication (Barrett) it was noted that the Farmers Union "has led an unprecedented fight within the rank of its own membership for schools that would train the farmer boys in practical farm science" (p. 89). The Farmers Union was an early supporter of an agricultural school known as the cotton school. Barrett (1909) noted that Alabama held a most successful cotton school at Auburn in 1907:

> The purpose of these cotton schools was to teach the farmers how to grade cotton. Boys from every section of the state in which the school was held flocked in droves to the schools. They were eager to learn. The agitation which had been going on for several months; the debates in the conventions and other meetings of the Union, and numerous newspaper articles, by farmers and others interested in these schools had created a thirst for this kind of knowledge that was little short of marvelous. (p. 91)

At its annual convention in 1912, the Farmers Union endorsed all pending vocational legislation before Congress (Blauch, 1933).

### National Grange

The National Grange took stands on education as early as the 1870s. In 1879 the National Grange advocated compulsory education (Buck, 1913). Several state granges worked on educational issues during this decade. Chief among them were Wisconsin, Indiana, Maine, and Michigan (Buck, 1913). Buck also noted the chief concern was uniform textbooks to be offered at cost.

In 1876 a resolution was passed by the National Grange declaring that agricultural colleges should be under the control of farmers and should be separate and distinct schools. There is some question as to how much influence such resolutions had upon colleges, "but at least it spread a knowledge of the opportunities in existence for agricultural education and was perhaps a factor in bringing about the great increase in the number of students seeking instruction along these lines" (Buck, 1913, p. 292).

Blauch (1933) stated concerning vocational education, "the greatest interest among farmers was expressed through the Grange" (p. 82). He further noted that numerous state granges and local organizations were active in promoting the Page-Wilson vocational bill of 1912. The National Grange encouraged every state grange to assist with the enactment of Page-Wilson vocational bill into law and to make the influence "rigorous and continuous" (Blauch, 1933, p. 82).

### National Soil Fertility League

The purpose of the National Soil Fertility League was to promote interest in the opportunities of agriculture as a vocation. It was formed by a number of bankers, railroad officials, and other midwestern businessmen in 1911 (Blauch, 1933). The League had virtually no interest in the vocational part of the federal legislation. It was, however, quite interested in and supportive of the extension part of the federal legislation (Blauch, 1933). In the end it was helpful to the coalition to have the extension bill (Smith-Lever Act of 1914) passed before the Smith-Hughes Act was introduced.

## Higher Education Interests

Because of the land-grant acts of 1862 and 1890, higher education had course offerings in agriculture before secondary education. In order for vocational education to obtain the support of higher education interests it was necessary to settle differing views on both agricultural research and extension. It was also important to determine where agricultural teacher training would be offered.

### Association of American Agricultural Colleges and Experiment Stations

One of the vocational education issues which concerned the Association of American Agricultural Colleges and Experiment Stations was the location of experiment stations for research. The first Dolliver bill introduced January 5, 1910 proposed dividing each state or territory into districts of from five to 15 counties, "providing in each district for one secondary agricultural school and a branch experiment station" (Dolliver, 1910, p. 3).

Another issue was separation of extension and vocational education. The second Dolliver bill introduced June 22, 1910 included funding for both extension and vocational education (Swanson, 1951). The Page bill introduced April 6, 1911 (later merged with a bill supported by Congressman Wilson to become the Page-Wilson bill) also included funding for both extension and vocational education.

Dr. A. C. True testifying before the 1914 Commission on Vocational Education in his role as President of the American Association of Agricultural Colleges (he also served as

Director of the Office of Experiment Stations) recognized both issues. He testified, "All Federal grants made to the States for scientific researches and practical experiments should be given to colleges and universities and not to secondary schools" (Report, 1914, p. 209). I think the schools should cooperate with the extension agents, and undoubtedly they will" (Report, 1914, p. 211). True further endorsed vocational agriculture and vocational education by testifying that "the association which I am representing here this morning favors the creation of secondary schools of agriculture and the institution in connection with those schools of strictly vocational instruction" (Report, 1914, p. 219). True read to the committee the Association's official position on vocational education as passed at its 1912 convention:

> Resolved, that this association reaffirms its declaration favoring "Federal aid for public schools of secondary education in agriculture, home economics, the trades and industries, including manual training, and for the education and professional training of teachers for these schools in the several states, as may be determined by the legislature." (Report, 1914, p. 223)

Wirth (1980) indicated passing the Smith-Lever Act was crucial for passing the Smith-Hughes Act. "A period of fascinating politicking went on until the enactment of Smith-Hughes, including a _quid pro quo_ agreement whereby the Smith-Lever Act for the farmers was passed (1914) in return for support of the agriculturalists for Smith-Hughes, which became law in 1917." (pp. 91-92)

## Normal Schools

During the early 1900s normal schools functioned primarily as post-elementary institutions. Robinson and Jenks (1913) described normal schools as "graduating their students in four years beyond the eighth grade, or in one or two years after the high school . . ." (p. 45). At this time the normal schools became interested in receiving Federal support for the preparation of vocational teachers similar to what had been provided for the land-grant universities in the Morrill Acts and the Nelson Amendment. The Nelson Amendment of 1907 granted $25,000 per year to colleges of agriculture for the preparation of teachers of agriculture and mechanic arts (Wheeler, 1948). Homer Seerley, President of the State Normal School of Iowa, testified before the Senate Committee on Agriculture and Forestry February 26, 1908 and stated:

> We have hoped that the National Government would do for the normal schools in small measure what they have attempted to do for other institutions of learning, like the mechanic arts colleges and the agricultural colleges, in order that we may carry this encouragement

> and this instruction to the country schools; and by means of the normal schools we feel that this problem (preparation of teachers) can be very much better solved than by any other agency with which we are acquainted (Hearings, 1908, p. 3).

Abbey (1909) suggested a curriculum for normal schools to use for preparing agriculture teachers. It consisted of such topics as soil, atmosphere, seeds, the plant, cereals, forage crops, fiber plants, weeds, horticulture, rural school grounds and buildings, farm animals, cattle, dairying, horses, sheep, swine, poultry, care of stock, farm management, and school-extension work (pp. 12-13).

Several vocational bills were introduced to the United States Congress which included support for teacher preparation at normal schools. Politicians who introduced such legislation included Burkett of Nebraska, Dolliver of Iowa, Davis of Minnesota, and Page of Vermont (Swanson, 1951). The ultimate compromise established was one suggested by Charles Prosser. He suggested that normal schools prepare teachers for the teaching of elementary vocational subjects (Hearings, 1914). The compromise established at that time left vocational teacher preparation for the secondary level to land-grant universities.

## Higher Education Administrators

Eugene Davenport, Dean of the College of Agriculture at the University of Illinois during the early 1900s was a strong proponent of vocational education. In a speech delivered in 1908 (Davenport, 1908) noted that, "if we are to have universal education then it must contain a large element of the vocational . . ." (p. 5). He was also a supporter of offering agricultural education in the comprehensive high school not a separate school: "yet the defect is not inherent in the system, and that the remedy is to expand the local high school and enrich its course, not to establish a rival on a still narrower plan." (Davenport, 1908, p. 2). One other higher education administrator who publicly supported federal funding for vocational education included W. O. Thompson, President of The Ohio State University. He submitted written testimony to the 1914 Commission, including a resolution of support from the Association of American Agricultural Colleges and Experiment Stations (Report, 1914).

## IMPLICATIONS

Special interest groups have always been an important part of the political process. Agricultural interests cooperated in the early 20th Century to support and help pass the Smith-Hughes Act. This coalition was successful because compromises were reached and special interests worked together with a united front. If each interest group had introduced its own piece of legislation, as normal schools did, the outcome might have been quite different.

A major implication for today's agricultural educators is that possibly a similar coalition should be put together for work with the United States Congress. Such a coalition could well help call more attention to the needs of agriculture. A second historical lesson is that a more favorable vocational act can be obtained when compromises are reached before the legislative process begins. This results in a much more united front than a situation where each interest group introduces its own legislation.

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# WHICH ACT STARTED AGRICULTURAL EDUCATION?
# WAS IT REALLY THE SMITH-HUGHES ACT OR WAS IT THE HATCH ACT?

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## INTRODUCTION/NEED FOR THE STUDY

If a graduate student (or even first year agricultural education major) was asked which piece of federal legislation was responsible for starting agricultural education the reflex answer would be "The Smith-Hughes Act of 1917." If by some strange quirk, the student replied that it was the Hatch Act of 1887 he or she would most certainly be quickly "corrected." It is the contention of this researcher that the Hatch Act was the act that started agricultural education and this fact is one of the best kept secrets in the profession.

Since 1987 is the 100th anniversary of the passage of the Hatch Act it would be appropriate to look back at the Act and examine its impact on the development of agricultural education. A review of the objectives of the Hatch Act and their implementation may even provide agricultural educators that do not have access to Hatch funds the necessary rationale and background information to obtain Hatch funds.

## OBJECTIVES OF THE STUDY

The purpose of this research paper is to acquaint the members of the profession with the provisions of the Hatch Act and their impact on the development of agricultural education. Specific objectives were to:

1. Identify the activities of the U. S. Office of Experiment Stations that lead to the development of secondary agricultural education.

2. Identify the historical background for support of agricultural education activities from Hatch funds.

## METHODS AND PROCEDURES

Standard historical research procedures were used. The major sources of information were United States Department of Agriculture publications that were published between 1887 and 1917. The researcher paid careful attention to internal and external criticism concerns. One to two pages could be written detailing the procedures and documents used but it would be of more value to devote the space to the results. The procedures used in the research were sound.

## RESULTS: FINDINGS, CONCLUSIONS, RECOMMENDATIONS

To people who have some knowledge of federal legislation the Hatch Act of 1887 is thought of as the Act that established agricultural experiment stations for the purpose of conducting agricultural research. This is correct, but only partially correct.

### Setting the Stage - The Office of Experiment Stations

After the passage of the Morrill Act in 1862 the states went about the business of establishing land-grant colleges. Agriculture was to be a major component of these new colleges. However, one of the problems encountered was that of finding agricultural professors. The early professors of agriculture were often "retread" chemists or botanists and were not looked upon highly by their liberal arts and scientific colleagues who viewed agriculture as unworthy of study and having no scientific basis. The farmers disdained the agricultural professors because their teachings were too science oriented, bookish and impractical (Marcus, 1985). There was a real need for scientific agriculture that could be used by the farmer.

Soon after the establishment of the land-grant agriculture colleges it became apparent that there was a need for agricultural experimentation in order to provide a scientific base for agriculture and to help solve the agricultural problems of the farmers. However, the Morrill Act had made no provisions for agricultural research.

In an attempt to promote experimentation in agriculture a movement was started to organize an association of research minded agricultural professors. A professor of "practical agriculture" from Michigan Agricultural College and the secretary of the board of trustees of Illinois Industrial College organized a meeting in Chicago in 1871. The group called themselves the Friends of Agricultural Education. The purpose of the meeting was to promote intercollegiate experimentation in agriculture (Knoblauch, Law, and Meyer, 1962). This meeting did not accomplish its objective because of conflicts between the college presidents in attendance and the agricultural professors; however, the meeting did get people to think more seriously about the concept of agricultural experimentation.

In 1881 a group of agricultural professors from eight midwestern states met at Michigan State and organized a regional association promoting research in agriculture. This action was followed by national conventions of land-grant colleges in 1882 and 1883 under the auspices of the U. S. Commissioner of Agriculture (Knoblauch, Law, and Meyer, 1962). At the 1885 national meeting there was much discussion about agricultural experimentation and the relationship of the land-grant colleges and the U.S. Department of Agriculture (USDA, 1885). The discussions at these meetings and subsequent actions by the participants in their home states helped to focus attention on several bills under consideration by Congress to establish agricultural experiment stations.

On March 2, 1887 Congress passed a bill that was signed by President Cleveland; it was commonly called the "Hatch Act" (24 U.S. Statutes at Large, 440). The first paragraph starts, "Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That in order to aid in acquiring and diffusing among the people of the United States useful and practical information on subjects connected with agriculture, (underline mine) and (bold type mine) to promote scientific investigation and experiment respecting the principles and application of agricultural science, there shall be established under direction of the college or colleges or agricultural departments of colleges in each State and Territory . . . an agricultural experiment station . . ."

Section 2 of the legislation listed 10 specific areas of agriculture to be researched such as crops, livestock nutrition, fertilization, etc. The final statement in the section read ". . . and such other researches or experiments bearing directly on the agricultural industry of the United States as may in each case be deemed advisable, having due regard to the varying conditions and needs of the respective States and Territories."

Six months after the passage of the Hatch Act, on October 18, 1887, the land-grant university presidents and agricultural professors that had been meeting before the passage of the Act, met in Washington to formalize the establishment of an association to improve communications and coordinate activities in regards to agricultural instruction and experimentation (Conover, 1924). This group become known as the American Association of Agricultural Colleges and Experiment Stations (AAACES).

The AAACES promoted the establishment of a central office in the U.S.D.A. to coordinate the work of the various stations and to serve as a medium of communication between the various experiment stations. As a result of their effort, the Office of Experiment Stations (OES) was established in October of 1888 as a special branch of the Department of Agriculture with an appointed Director as its head (True, 1888). Dr. Wilbur O. Atwater served as the first Director from 1888 until 1891. Dr. Abram W. Harris was the second director, serving from 1891 to 1893. Dr. A. C. True became the third director in 1893 and remained in that position until after the passage of the Smith-Hughes Act.

The remainder of the paper will concentrate on the efforts of the U.S.D.A. Office of Experiment Stations, under the auspices of the Hatch Act, to develop agricultural education in the public schools. It should be remembered that one purpose of the experiment stations as specified in the Hatch Act was ". . .to aid in acquiring and diffusing among the people of the United States useful and practical information on subjects connected with agriculture..." During the first 30 years of the Hatch Act the Office of Experiment Stations strongly supported the "diffusion of information" aspect of the legislation through secondary agricultural education.

## The Relationship Between the Early Secondary Agricultural Schools and the State Experiment Stations

Almost immediately after the passage of the Hatch Act a strong relationship was established between experimentation stations and secondary education in agriculture. In 1888, after widespread dissatisfaction with the college level teaching of agriculture at the University of Minnesota, a school of less than college grade was established on the grounds of the agricultural experiment station. Agriculture was to be taught on a practical and scientific basis. The school faculty of nine included five from the experiment station. Students were involved in the work of the experiment station. The school was very successful. True (1925) noted "This school and the experiment station were so successful that the legislature from time to time appropriated generously for buildings, equipment, and current expenses. For a considerable period the schools of agriculture and dairy overshadowed the collegiate work . . ." The first secondary agriculture school in the nation was inexorably connected with the experiment station. The example of the Minnesota school was followed by Nebraska in 1896 and later by about two-thirds of the states (Conover, 1924).

Alabama organized secondary agricultural schools _and_ branch agricultural experiment stations in 1889 (Owens, 1909). Instruction in "practical and scientific agriculture" was offered at nine schools; one in each congressional district. The experiment station work carried on at each school was under the auspices of the Alabama Polytechnic Institute. In 1907, Governor Comer spoke highly of the agricultural schools and accompanying experiment stations and urged the legislature to increase appropriations for each school. The legislature responded by appropriating $4,500 to each school with the provision that $750 be spent on experiments. The experimental work carried on in these schools was simple and consisted primarily of variety and fertilizer tests, crop rotation, and cultivation methods.

In _The Historical Development of the Congressional District Secondary Agricultural Schools in Alabama_, Thompson (1965) indicated one of the contributing factors to the development of these schools was the United State Department of Agriculture. The Alabama District Schools served as the model for a number of other southern states in the establishment of agricultural schools of secondary grade.

## The Office of Experiment Stations Promotes Secondary Agricultural Education

In 1893 the federal Office of Experiment Stations started to become deeply interested in agricultural education below the collegiate grade (True, 1925). The Office of Experiment Stations started an active campaign in different parts of the country to promote the introduction of agriculture into the secondary schools through its publications, addresses at educational and farmers' meetings, and correspondence and conferences with educators and others interested in this matter.

Writing in the _Yearbook of the United States Department of Agriculture_ for 1897, Director True of the Office of Experiment Stations advocated the establishment of courses in agriculture in schools near the farmers' home (True, 1898). Nearly every issue of the Yearbook of Agriculture after then until the passage of the Smith-Hughes Act contained an article about the development or need for agricultural education in the public schools.

True's annual report as Director of the Office of Experiment Station in 1897 contained a report on the development of education in agriculture in the public schools. Conover (1924, p. 67) reported that ". . . the Director attempted to encourage the movement." Most of True's annual reports after 1897 reported on the progress of agricultural education and outlined what the Office of Experiment Stations was doing to aid the movement.

In 1901, Dick Crosby, was added to the staff of the Office of Experiment Stations as a special assistant to the Director in work related to agricultural education (True, 1925). Crosby and True vigorously promoted the teaching of agriculture in the public schools in a variety of ways.

Both Crosby and True were vitally involved with the activities of the American Association of Agricultural Colleges and Experiment Stations. At the AAACES meeting in 1895 a standing committee on methods of teaching agriculture was established. The committee prepared annual reports on various topics of concern. The first six reports were concerned with collegiate level education in agriculture (True, 1909). The seventh report (Office of Experiment Stations, 1902) showed how secondary courses in agriculture could be incorporated into existing high school courses. In the report it is stated (p. 4), "Agriculture has thus far been almost entirely neglected in the high school programmes, and it is high time that the friends of agricultural education should make a systematic effort to have the claims of this fundamental industry acknowledged and satisfied in the curricula of the public schools." True was a member of the committee that made the seventh report. The ninth report was devoted to the teaching of agriculture in the rural common schools (Office of Experiment Stations, 1904).

A standing committee on instruction in agriculture and mechanical arts of secondary grade was established by the AAACES in the fall of 1905. Director True was the chairman of the committee and Dick Crosby was the secretary. One of the first activities of this committee was to get the National Education Association (NEA) to recognize the need for agricultural education in the secondary schools (Lane, 1942). The NEA was dominated by educators who did not view vocational education very favorably. The actions of the committee resulted in the formation of a department of rural and agricultural education in 1906 in the NEA.

In September of 1905 a department of agricultural education was established in the Experiment Station Record. Reports on agricultural education were published here.

In 1906 a division of agricultural education was established in the Office of Experiment Stations. Dick Crosby was put in charge of the work. The division had several employees and was very active in promoting and supporting agricultural education. Crosby's assistant, C. H. Hansen, prepared a complete lantern-slide series dealing with the teaching of agriculture in public schools (Lane, 1942).

Many states were establishing public school instruction in agriculture in the 1906-1917 era and were searching for instructional materials and curriculum guides. True (1925) reported that the Office of Experiment Stations served as ". . .a clearing house of information and advice regarding the courses, personnel, equipment, illustrative material, and literature for secondary instruction in agriculture. . ." In Two Hundred Years of Agricultural Education in Georgia Wheeler (1948) reported that Dick Crosby of the Office of Experiment Stations was ". . . largely responsible for the curriculum development . . ." in the eleven congressional district agricultural schools established in 1907 in Georgia.

The Office of Experiment Stations issued numerous publications related to the teaching of agriculture. Many of the publications pertained to the teaching of technical subject matter and were based on the work of the experiment stations (Ekstrom, 1969). The findings of experiment station research quickly found its way to the public through the bulletins and circulars designed for the teachers of public school agriculture. A listing of the circulars printed by the OES between 1909 and 1913 provide a good example of the concern of the OES for agricultural education. The circulars included Normal School Instruction in Agriculture (1909), Free Publications of the Department of Agriculture Classified for The Use of Teachers (1910), How to Test Seed Corn in School (1910), Institutions in the United States Giving Instruction in Agriculture (1912, This was complete listing of each secondary school in the United States where agriculture was taught), A Secondary Course in Animal Production (1911), A Working Erosion Model for Schools (1912), and The Work of the Agricultural Colleges in Training Teachers of Agriculture for Secondary Schools (1913). It should be obvious from looking at the titles of the bulletins, the OES was concerned with all phases of secondary agricultural education.

At the 1907 AAACES meeting True discussed the two curricula that had been prepared by the Office of Experiment Stations in agronomy. There had been some criticism that one of the curricula was too advanced for many of the rural schools. True indicated that this had been done on purpose because (Office of Experiment Stations, 1907, p.38) "There is a feeling among schoolmen that agriculture is not a proper subject for high school instruction, because it can not be put in form which will make it a stiff enough course for high school work as compared with courses in the natural sciences and other subjects. An attempt is made in this bulletin to show that a good, solid, and substantial course in agriculture, suited to high schools, can be prepared."

A resolution was offered at the 1907 meeting of the AAACES by E. R. Nichols of Kansas "That the Association of American Agricultural Colleges and Experiment Stations urges upon the Congress liberal appropriations to enlarge the work of the Office of Experiment Stations along the lines of investigations and publications in relation to methods of instruction in agriculture relating to the farm, to the farm home, and to rural interests generally."

Additional monies had been authorized for experiment station funding in the appropriations for the Department of Agriculture for 1907 (34 Statutes at Large, 669, 693). One of the provisions of the 1907 appropriations act stated, "That five thousand dollars of this sum shall be used by the Secretary of Agriculture to investigate and report upon the organization and progress of farmers' institutes and agricultural schools in the several States and Territories and upon similar organizations in foreign countries, with special suggestions of plans and methods for making such organizations more effective for the dissemination of the results of the work of the Department of Agriculture and the agricultural experiment stations and of improved methods of agricultural practice." This was the first in a series of annual appropriations to conduct research in this area. By the 1912-1913 fiscal year the appropriations had grown to $15,760 for research on "farmer's institutes and agricultural schools" (True, 1912, p. 14).

The pace to develop agricultural education in the public schools picked up around 1909. The early work of the Office of Experiment Station was gaining momentum. True, Crosby, and others in the USDA were fervent evangelists for the cause. However, there was considerable debate nationally over the need for vocational education, including agricultural education, in the public schools. Many educators were either opposed to this new type of education or were opposed to the proposed delivery system (Wirth, 1972). The Office of Experiment Stations took an active role in the debates. During the National Education Association convention in 1909 Dick Crosby presented the views of the Office of Experiment Stations regarding the need for and proposed nature of agricultural education in the public schools.

A glimpse of the eloquence and fervor of Crosby in promoting agricultural education can be gleaned from his article "Agriculture in Public High Schools" published in the 1912 Yearbook of Agriculture. The opening sentence was bold and to the point (p. 471), "More than 2,000 public high schools in the United States are now teaching agriculture; 16 years ago there was not one." After describing the types and numbers of schools in which agriculture was taught, the status of state support, the curriculum, and the facilities, Crosby (p. 481) tells why agricultural education is important.

> "Whenever the teaching of agriculture in high schools has been taken seriously, whenever suitable equipment and capable teachers have been provided, the schools and everyone connected with them have been benefited; the attendance has increased; the schoolwork has assumed a

> more businesslike air; as if it dealt with the realities of life, with real problems instead of imaginary ones; and the relationships between teachers, pupils, and parents have become closer and more sympathetic."
>
> "High schools in which agriculture is something more than a new textbook subject, in which it reaches out to the surrounding homes and farms for its problems and illustrative materials, soon acquire a hold and exert an influence upon the community such as other schools have never been able to get. The people come to know their school better and are loyal to it. They see it as educating their sons--not for some allurement in the distant future, but for life in the world to-day, in the home neighborhood, in another State, or wherever they go. Moreover, they feel that school is a school for everybody--of educational, social, and pecuniary benefit to all. . . Instead of trying to education a select few for high professional positions, it is endeavoring to make a better people and a better land."

In 1910 True published a Circular (No. 93) titled "Organization, Work, and Publications of the Agricultural Education Service." In this publication True (p. 1) described the function of the Agricultural Education Service in his Office. He stated "The Office of Experiment Stations in the general agency of the Department of Agriculture to deal with the various colleges, schools, and extension departments in the United States concerning matters relating to the promotion of agricultural education". Under the heading SCOPE OF WORK True (p. 2) wrote "In its relations with agricultural colleges and schools the Office (1) collects and publishes information regarding the progress of agricultural education at home and abroad; (2) visits and studies different grades of American and foreign schools in which agriculture is taught; (3) cooperates with the Association of American Agricultural Colleges and Experiment Stations in Conducting the Graduate School of Agriculture and in formulating courses of study for colleges, normal schools, special agricultural schools, and public secondary and normal schools; and (4) aids agricultural colleges and schools, state and local school authorities, and national and state associations of educators along lines of agricultural education."

Director True was serious about the role of his office in developing agricultural education. In one year, people in his office traveled 38,000 miles and visited schools and attended educational gatherings in 28 different state in their quest to develop agricultural education (Conover, 1924). To assist teachers in "visual instruction", lantern slides were "pedagogically arranged and sent out" (Conover, 1924, p. 70). Other illustrative materials supplied to the schools included charts and photographs. Sometimes experimental courses were conducted by the Office and their results given to other schools. The OES even maintained a card index of practically all agricultural educators in the United States.

The OES cooperated with teacher training institutions in various states, and supplied them with classified lists of all departmental publications, lists of materials that might be utilized by teachers, and offered suggestions as to how teachers might use particular Farmers' Bulletins in their work. Similar work was performed in connection with inservice education of teachers; publications conforming to their special needs were sent to them (Conover, 1924).

In 1913 the agricultural education division of the Office of Experiment Stations initiated the plan of calling annual conferences of states supervisors and teacher educators in agricultural education in the North Atlantic, Southern, and Central Regions (Lane, 1942). Conover (1924, p. 69) reported that "At these and numerous other personal conferences the federal staff members would give the conferees the advantage of their knowledge of educational practices in various schools, and would suggest plans for making their studies productive of immediate results. . . home-project work was especially encouraged. These conferences were followed up through correspondence, personal advice, and materials for use in teaching.

In 1915 the Office of Experiment Stations was reorganized into the States Relations Service (SRS) of the USDA (USDA, 1963). Dr. True became the director of the SRS. One of the newly created divisions in the SRS was the Division of Agricultural Instruction. They continued their support of agricultural education.

Between January of 1915 and December 1916 "Agricultural Education Monthly" was published monthly (except for the summer months) by the State Relations Service. This publication provided suggestions on both the pedagogical and subject matter aspects of teaching agriculture (Lane, 1942).

By 1914 it was clear that agricultural education was firmly established in the public schools. The question on whether or not agricultural education should be taught was a moot point, the question was on how to organize it. In the 1914 Annual Report of the Director of the Office Experiment Stations True stated "The period of propaganda for the establishment of institutions and courses devoted to agricultural instruction has about come to an end. The main problems now relate to the effective organization of this work and the supplying of up-to-date subject matter and illustrative material in proper form for use in the schools." This statement, by the Director of the Office of Experiment Stations, reflected the culmination of 25 years of commitment to the "dissemination of information" provision of the Hatch act. Agricultural education had been established.

After a thorough review of the Office of Experiment Stations, Conover (1924, p. 71) concluded that ". . . the Office of Experiment Stations . . . made the teaching of agriculture in the elementary and high schools an established feature in American education within a short period."

## Conclusions

By 1916 agricultural education in public schools in the United States was relatively strong. Agriculture was being taught in 2,981 high schools. Over 60,000 students were enrolled in agriculture (Warmbrod, 1963). It is the opinion of this writer that the Office of Experiment Stations was the most significant factor in the widespread teaching of agriculture in public schools prior to 1917. The provision of the Hatch Act to disseminate agricultural information to the people lead to the establishment of agricultural education in public secondary schools. In some states this teaching was integrated with the work of the experiment stations. The federal Office of Experiment Stations was active in promoting the dissemination of experiment station research through their support of public school education in agriculture.

Many people erroneously believe agricultural education was started when the Smith-Hughes Act was passed in 1917. The Smith-Hughes Act simply provided federal funds directly to states to continue supporting the teaching of agriculture, established strict guidelines for operation of high school agriculture programs, and made the instruction more vocational. The Smith-Hughes act did not start agricultural education in the secondary schools. It would be more correct to say the Hatch Act started agricultural education of secondary grade; the Smith-Hughes Act merely extended the work.

The wording of the original Hatch Act contained no provisions to prevent the funding of agricultural education research from Hatch funds. In fact, the wording would appear to support agricultural education research and development activities. This assertion is further reinforced by Congressional appropriations allocating money to the USDA with money specifically earmarked for research in agricultural education.

## POSTSCRIPT

After the passage of the Smith-Hughes Act a number of employees (such as C. H. Lane) and some functions of the States Relations Service were transfered to the newly created Federal Board for Vocational Education. However, the SRS continued to maintain its division of agricultural instruction and provided support to agricultural education. Numerous bulletins, primarily on technical agriculture subjects, were prepared by the SRS specifically for vocational agriculture instructors (Shinn, 1942). The SRS also continued to provide illustrative materials, including lantern slides, film strips, and motion pictures to vocational agriculture teachers.

Shinn (1942, p. 574) reported, "The division of agricultural instruction of the United States Department of Agriculture was discontinued in 1929 after have made substantial contributions to the teaching of agriculture in both secondary and elementary schools of the country. The Nation-wide program of vocational education in agriculture sponsored by the Federal Board for Vocational Education in cooperation with the States had by that time become well established and the Board had employed sufficient personnel to prepare such material as was needed by agricultural teachers."

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# THE EVOLUTION OF THE PROBLEM-SOLVING APPROACH IN AGRICULTURAL EDUCATION: A HISTORICAL ANALYSIS

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## INTRODUCTION

The problem-solving approach has been used in agricultural education for decades and recommended by agricultural teacher educators as a superior method of teaching. The importance of this approach for use in teaching vocational agriculture can be attested to by the fact that major textbooks on teaching methods in agricultural education (Binkley and Tulloch, 1981; Crunkilton and Krebs, 1982; Newcomb, McCracken, and Warmbrod, 1986; and Phipps, 1980) have included a section on the problem-solving approach. In 1984, Crunkilton and Moore & Moore debated the effectiveness of the problem-solving approach in special feature articles of The Journal. The topic has also been the subject of research, the most recent conducted by Flowers and Osborne (1986) on the effects of the problem-solving approach on achievement, retention, and attitudes of vocational agriculture students.

As a profession it would appear that we know a great deal about problem-solving. But, do we really? Most textbooks on teaching methodology adequately cover the steps to the problem-solving approach but few devote any space to discussing the inception and evolution of this widely accepted practice. Did the problem-solving approach come to agricultural education by historical accident as suggested by Moore and Moore (1984) ? As a profession, we should be as adequately informed on the development of the problem-solving approach as we are on the procedures for implementing it in the classroom. This research study was conducted to discover the evolution of the problem-solving approach in agricultural education.

The results of the research are enlightening in terms of examining the theoretical basis for the effectiveness of the problem-solving approach and its appropriateness for use in agricultural education today.

## PURPOSES AND OBJECTIVES

The purpose of this research was to discover the evolution of the problem-solving approach in agricultural education from its inception. Specific objectives were:

1. To identify individuals instrumental in developing problem-solving as an approach for teaching vocational agriculture.

2. To identify events in the history of the development of agricultural education that influenced the adoption of the problem-solving approach.

3. To identify changes in the application of the problem-solving approach in teaching vocational agriculture.

## METHODS AND PROCEDURES

Research procedures appropriate to historical research were used in conducting this study. The first step in historical research is to collect historical data. In this study the researchers collected historical materials dating to the 1900's. Computerized literature searches of educational databases were conducted along with a hand search of older publications which were not included in the databases. Specific publications examined were:

The Agricultural Education Magazine
Textbooks in Agricultural Education
Early Textbooks in Education
The Journal of the AATEA
U. S. Government Documents

Thirty-five different source materials were identified which were deemed important in light of the objectives and were used in this study. With careful attention to both internal and external criticism, the information collected was organized and conclusions and generalizations formulated.

## RESULTS

### Early Methods of Teaching

Early education (prior to late 1800's) consisted of primarily three teaching methods, individual instruction, recitation and graded system (Thayer, 1928). The method of recitation was widely discussed by early educators. Charles McMurry and Frank M. McMurry wrote an entire book on recitation called The Method of Recitation (1903). Recitation was a large part of Herbart's Formal Steps of Instruction. Herbartians like Ziller, Rein, DeGarmo, and McMurry advocated the Herbart approach to teaching (DeGarmo, 1895; McMurry, 1903; Bagley, 1908).

Books written specifically on teaching agriculture emerged during the early 1900's. It is believed that Gerald Bricker's book The Teaching of Agriculture in the High School (first copyright 1911) is the first book written on the teaching of agriculture. Bricker advocated that "a properly organized course in secondary agriculture must be primarily and fundamentally a series of laboratory and field exercises made up of carefully selected materials, pedagogically and systematically arranged, around which recitations, lectures, and reading will center as supplementary work" (Bricker, 1916, p. 127).

Another early book, Materials and Methods in High School Agriculture (Hummel & Hummel, 1913), identifies three ways for pupils to acquire knowledge: "by authority, by observation, and by experimentation" (p. 69). The Teaching of Agriculture (Nolan, 1918) gives further insight to the teaching approaches advocated for agricultural education. Nolan discusses the following approaches: use of textbooks, reports and class recitations, lecture, use of illustrative material, laboratory methods, and home projects. In 1918, first year of vocational agriculture under the Smith-Hughes Act, it was observed that vocational agricultural teachers were assigning lessons in textbooks, using recitation and lecturing as approaches to teaching. The project method of instruction was also sighted as being used (Stimson, 1942).

New approaches to teaching began to emerge when educators became dissatisfied with the approaches that only provided knowledge and book information without interrelating classroom work with other school activities and with issues of American life (Thayer, 1928). According to Thayer, "Not only do these new concerns of the school call for new methods of teaching and a transformed school organization; they call as well for an education which abandons the compartmental procedure of the past in which culture and vocation avoid more than a speaking acquaintance" (p. 159).

An early American educational leader in agreement with the philosophy espoused by Thayer was John Dewey. Dewey became a primary force in the revolution of the educational system. His philosophy on pedagogical matters greatly influenced the changes which occurred in the early 1900's.

## Dewey's Contributions

Dewey began to be recognized as an outstanding educator with his work at the School of Education at the University of Chicago (Getman, 1932). In his book, School and Society (1900), Dewey called for a transformation of the school system to coincide with the radical social changes that had occurred. He emphasized student centered education that "introduces and trains each child of society into membership within such a little community, saturating him with the spirit of service, and providing him with the instruments of effective selfdirection, we shall have the deepest and best guarantee of a larger society which is worthy, lovely, and harmonious" (p. 44). Learning experiences of children at Dewey's elementary school were illustrated in School and Society. He emphasized that children should learn from their own experiences and working out their own problems.

Dewey's book, How We Think (1910), further emphasizes his attitudes towards a new and better way of educating students.

Teaching students to think is extremely important in educating them for membership in society. To think means to "bridge a gap in experience, to bind together facts or deeds otherwise isolated" (p. 79). Students should learn to think systematically and not haphazardly. To Dewey, systematic thinking involved both inductive and deductive thought. Thought was to include deliberate and intentional activities in a systematic fashion. Thus, objects reflected upon were to have more value to the individual.

Dewey does not use the term "problem-solving", but the steps of his "reflective thinking" coincide with steps of our modern day problem-solving technique. The five steps of reflective thinking, as outlined by Dewey, are as follows:

1. felt difficulty
2. its location and definition
3. suggestion of possible solution
4. development by reasoning of the bearings of the suggestion
5. further observation and experiment leading to its acceptance or rejection (p.72).

In the discussion of steps 1 and 2, Dewey states that the two often blend together and emphasize a "perplexity or problem". A felt difficulty or need is expressed by the student. Suggestions for possible solutions are made from inferences concluded from known knowledge. "Hypotheses" are formed but a solution is not chosen pending further evidence. Implications are reasoned from past experience and new information. Verification is made once the hypotheses are tested and then conclusions or solutions are derived. Both inductive and deductive thought are used in the five steps of reflective thinking with inductive thought moving towards discovery of principle and deductive thought moving towards testing the principle.

In Democracy and Education (1916), Dewey outlines five stages of the thinking method. This method uses problems to teach subject matter; problems based on the experience of the students. Experiences furnish resources for dealing with the problem at hand. "New problems" should be large enough to challenge thought, but small enough so past experience or familiar information will spring suggestions and thinking will occur. Collection of data from past experience and new resources arouses suggestions for solutions to the problem. Suggestions must then be applied for a solution to be derived.

Dewey believed that the best type of teaching motivates students to think and involves their "out-of-school experiences" in the lesson. According to Dewey, the thinking method accomplished that objective. The problem-solving approach of teaching used today accomplishes the same purpose. The two methods, reflective thinking and thinking method, appear to be the predecessors of the problem-solving technique used in agricultural education today. Therefore, Dewey must be given credit for conception of the idea of problem-solving. However, "he was much stronger at formulating and discussing pedagogical theories than at making practical applications" (Burton, 1935). The practical applications of the problem-solving approach came later through other individuals. Early agricultural teachers who were trained by academic educators were primarily responsible for the application of the problem-solving approach in agriculture. Since Dewey was at the peak of his career when agricultural education emerged as a secondary school subject, many of the early teachers were influenced by Dewey's teachings and readings.

## Charters' Contributions

One of Dewey's students at the University of Chicago was Werrett Wallace Charters. Charters is quoted as saying: "I suppose I should be classed as a disciple of Dewey because I studied under him during his last three years at the University of Chicago. From these contacts I gained one central idea which has defined my interest and effort in the field of education" (Stewart, 1933).

After Charters graduated from the University of Chicago, he become very interested in methods of teaching (Stewart, 1933). Charters believed that the normal learning process involved problems and that learning was obtained when individuals attempt to find solutions to their own problems. Using this principle with students results in the "economy of mental effort, increase of interest, and more permanent results" (Lane, 1919 p.40). Teachers should search the experiences of students to find relevant problems of value (Charters, 1912). Stimson (1942) in a discussion of the problem method, refers to "W. W. Charters' problem-method concept" (p. 601). It is believed that Dewey implanted the ideas for which Charters titled the problem-method.

In Charters' book, Methods of Teaching (1912), he emphasizes that problems used in teaching should be real problems of importance to the students and serve as a motive for learning new subject material. The origin of such problems may be from habits, a conflict between ideas, concrete activities, curiosity and the discipline of natural consequences. Charters uses three steps for problem-solving, instead of five steps as outlined in Dewey's Reflective Thinking process. His steps include:

1. Recognition of the problem or defining the problem.
2. Attempt at solutions or forming hypotheses.
3. Testing the solutions or verification of proposed solutions.

Charters problem-solving method involves both inductive and deductive thinking similar to Dewey's reflective thinking method. According to Charters, induction manufactures the rules that deduction applies to particular cases.

In his book Teaching the Common Branches (1913), Charters dedicates a chapter to the subject of agricultural education. A section of this chapter discusses teaching methods to be used in teaching agriculture. The first method discussed is the problem method. Here, Charters states that the study of a "good practical problem" (p. 315) should include the collection of facts, intelligent guessing, and the study of textbooks. The best way of teaching new information is to develop a problem first and in the process of solving it, teach new facts.

Intelligent guessing can be used with problem-solving to encourage students to think on their own. Students should use books and bulletins to find information for solutions to the current assigned problems. Charters believed that facts "should be taught little by little, as the solution to little problems" (p. 317).

## Lancelot's Contributions

William Lancelot was also one of the early promoters of problem-solving in agricultural education. He is given credit for expanding the project method "to include the teaching of decision-making skills and abilities using real problems..." (Kahler, 1977). After receiving the Bachelor of Science degree in Agricultural Education in 1919, Lancelot pursued graduate study at several universities including Columbia University (Kahler, 1977). Dewey was teaching at Columbia during this time though it is not documented that Lancelot was an actual student of Dewey, it is presumed that he was influenced by Dewey's philosophical views.

In Lancelot's books, Handbook of Teaching Skills (1929) and Permanent Learning (1944), the problem-solving method is advocated as the method for permanent learning to occur. His books go into great detail on how to incorporate problems into the subject matter, the different types of problems that can be used, and how problems arouse a feeling of need; when problem-solving is appropriate, in addition to other aspects of using the method.

Lancelot believed students could be led to think by giving them something to think about. Thinking could be induced by giving students problems to solve. He defines a problem as "merely a thought question of relatively broad scope" which requires many minutes or even hours to solve (Lancelot, 1929, p.35). The technique should be used in the teaching of all subjects, but it may not be possible in all circumstances.

Lancelot originally had the thinking process in solving problems divided into 10 steps, but later modified the method into the following four steps:

> 1. Reach an early inference, or tentative opinion, as to the probable answer of the problem, based carefully upon such facts as are already known.
> 2. Search for further available facts.
> 3. Revise or change the original inference in such a manner as to bring it into closest possible agreement with all of the facts that have been brought together. This revised inference is called the conclusion.
> 4. Test the soundness, or validity, of the conclusion by noting how fully it meets the four standards below:
>    a. No bias, prejudice, or feeling should have been allowed to enter into the thinking process or to influence the conclusion in any way.
>    b. All facts that seem to have any important bearing upon the question should have been found.
>    c. The conclusion must not be in actual conflict with any important fact.
>    d. The conclusion should be so strongly supported by the body of facts, or evidence, taken as a whole, that it seems to have been proved true beyond any reasonable doubt (Lancelot, 1944, p. 91).

In both books, Lancelot goes to great length in discussing the finding, judging and testing of problems to be used in teaching. Problems chosen should have the following qualities: represent real life situations, interest the students, be clearly defined, be of proper scope and difficulty and call for superior thinking (Lancelot, 1929). Problems should induce inductive reasoning or judgement and creative thinking.

Once problems are chosen, they are tested by a scoring process. Every new problem should be tested before it is presented to the students. Testing eliminates defects which may lead to ineffective teaching. Lancelot recommended using a scale ranging from 0 to 5. With 5 representing excellence, 0 for total absence of the quality scored (Lancelot, 1944). Those problems falling below acceptable standards were to be revised or completely thrown out. "The quality of teaching is largely dependent upon the quality of the problems used" (Lancelot, 1944, p. 170).

In December of 1932, J. A. Starrak of Iowa State College, wrote an article on problem-solving in the Agricultural Education magazine. Beginning in June, 1933, the Agricultural Education magazine printed a series of 4 articles written by Starrak concerning problem-solving. It was observed that the material contained in the articles was very similar to Lancelot's book Handbook of Teaching Skills. Although Lancelot is not cited or given credit for the information given, it is most evident that the ideas Starrak presents are from Lancelot.

Lancelot developed the techniques for using problems to teach subject matter. He developed the rules or guidelines for teachers to implement in using the method. Lancelot had many followers because of his writings and teachings on the problem-solving approach to teaching. One of these followers was agricultural educator W. F. Stewart of The Ohio State University.

## Stewart's Contributions

Dr. Stewart served as Professor and Chairman of the Department of Agricultural Education at The Ohio State University from 1917-1948 (Bender & Wolf, 1972). In his teaching, Stewart emphasized the importance of methods, particularly the problem method of teaching. He believed firmly that if teaching is interesting, useful, and challenges thinking, then it needs to be related to the pupil's home and farm situation. For him, subject matter had only one use and that was to solve relevant problems (Bender & Wolf, 1972).

Stewart wrote a book concerning teaching, Methods of Good Teaching published in 1950. He dedicated the book "To My Master Teacher, William Henry Lancelot." However, Stewart did his graduate studies at the University of Wisconsin and at Columbia University while Lancelot was a professor at Iowa State College. William H. Wolf, retired professor of Agricultural Education at The Ohio State University, provided the missing link of information need to make the connection between Lancelot and Stewart. On November 25, 1986, Dr. Wolf was interviewed by telephone. He remembered that Stewart took a course one summer at Iowa State College. Lancelot taught the course which was centered around the problem-solving method. Stewart was impressed with Lancelot's teachings and the method for which he advocated. Thus, Stewart's writings on problem-solving were greatly influenced by his teacher, Lancelot.

Stewart's book is written in the 'you and I' style and therefore does not tell the students what methods to use but induces them to derive their own methods. He uses the problem approach within the book to stress methods of good thinking. At the conclusion of a section of information, a class problem is presented for discussion.

In the section referring to problem-solving, many of the same ideas for which Lancelot wrote are present. Stewart's procedure for the method consisted of five steps similar to Lancelot's procedure:

1. State the problem as clearly and definitely as its life situation permits...
2. Recall or find out the factors having a bearing upon the problem.

3. Recall or find out the facts related to each factor.
4. Evaluate the factors recognizing their relative importance in the specific situation under consideration.
5. With consideration given to the evaluation, make the decision (Stewart, 1950, p. 133).

Stewart discusses the concept of a "good problem." Like Lancelot, he uses a scale to judge problems for soundness.

### Present Day Contributors

The problem-solving approach used at the present time coincides with the views of our early leaders. Alfred H. Krebs' wrote a book, For More Effective Teaching (1954), on the problem-solving approach for teachers of vocational agriculture. Within his book, Krebs discusses the importance of planning for the effective use of a problem-solving approach in teaching. According to Krebs' plan, the teacher should select an enterprise to be studied. Then a problem area within the enterprise is identified. From the problem area the instructor and the students make a list of problems to solve. Once a list is established the learning process continues on to the steps of problem-solving:

1. Pupils select a problem from the list.
2. Pupils discuss the problem.
3 Supervised study is utilized to collect data.
4. Final discussion and conclusions.
5. Pupils select another problem from the list.

"A problem solving approach to teaching makes use of much that has been known for a long time about the teaching and learning process" (p.104).

Lloyd Phipps, in his book Handbook on Agricultural Education in Public Schools (1980), defines problem-solving as the scientific method adapted for classroom instruction. The use of problems presents life situations that creates a difficulty and requires thinking on the part of students. Phipps' approach includes the following steps:

1. Recognizing a problem situation.
2. Defining the problem.
3. Developing hypotheses regarding a solution.
4. Testing hypotheses and gathering data.
5. Revising hypotheses and testing revised or new hypotheses.
6. Forming a conclusion (p. 54).

Another textbook used by present day agricultural educators, Methods of Teaching Agriculture (Newcomb, McCracken, & Warmbrod, 1986), also discusses problem-solving as an approach to teaching.

The authors of the book compare the principles of learning to the stages of problem-solving (p. 68).

| | |
|---|---|
| 1. Experiencing a provocative situation | 1. Interest approach |
| 2. Defining the problem | 2. Group objectives |
| | 3. Questions to be answered |
| 3. Seeking data and information | 4. Problem solution |
| 4. Formulating possible solutions | |
| 5. Testing proposed solutions | 5. Testing solutions through application |
| 6. Evaluating the results | 6. Evaluation of solution |

Since the learning process is a problem-solving process, vocational agriculture teachers need to use this approach to enhance the learning of students.

## CONCLUSIONS

Although the problem solving method came to agricultural education by "historical accident", the followers of Dewey developed it into the preferred method for the profession. It is the belief of the authors that this method was not the sole work of one individual, but a conglomeration of ideas and beliefs of the individuals mentioned. Dewey planted the seed based on his philosophical ideas of how children should be educated. Charters did the early cultivation when the idea was just a seedling and identified the method as problem-solving. Lancelot cultivated and nurtured the seedling into maturity. He gave the method its shape and provided the guidelines for teachers to follow when implementing the method. Stewart harvested the fruit by advocating it as the method of teaching students "to make right decisions or to solve their own problems. Finally, present day agricultural educators espouse the problem-solving approach because of its correlation with the learning process. Since problem-solving has been considered as the method of instruction for decades and is still recommended as a superior method in agricultural education today, the historical development should be careful scrutinized for a better understanding of the teaching-learning process involved.

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# A NATIONAL STUDY OF MICROCOMPUTER USE IN VOCATIONAL AGRICULTURE PROGRAMS

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## INTRODUCTION

The number of vocational agriculture programs with microcomputers continues to increase as this technology gains support from school systems and as a result of the Perkins Vocational Education Act. This occurrence is logical and necessary since agricultural applications for computers are constantly being developed and implemented. As more agriculture departments obtain computers, the question arises as to what should be taught with and about the machines.

Research and evaluation of microcomputer use in education is extensive, but has been restricted largely to the computer's use in academic subjects. Taylor (1980) outlined three basic areas for microcomputer use in education - as a tutor, as a tool, and as a tuttee. Using the computer as a tutor refers to presentation of instructional units by the machine, a procedure commonly referred to as computer-aided instruction (CAI). The instructional management tasks such as materials preparation, word processing and data base use are examples of the computer's use as a tool. The third area of computer use, as a tuttee, involves students learning the language of the machine and having them "teach" the computer to perform desired functions.

Two of the three previously mentioned microcomputer uses have been addressed in agricultural education research. Neason and Miller (1982) indicated that the microcomputer's most profitable use was as a management tool. Specific uses of this type noted by McGrann (1980) include decision making, education, communication, data gathering, data analysis, monitoring, evaluation and data retrieval and storage.

The second microcomputer use employed by agricultural educators is using the machine as a tutor. Hudson (1980) specifically addressed computer aided instruction in agricultural education. He found that major uses included drill and practice, tutorial use, simulations, games, testing, and recording data. In a later study, Hudson (1983) compiled a list of 50 microcomputer use skills needed by agricultural computer users.

Utilizing Hudson's (1983) list of competencies, Sutphin (1984) surveyed New York vocational agriculture teachers to determine their opinion of the relative importance of these skills as well as the teachers' actual level of microcomputer usage. Information regarding other computer use factors was also obtained.

In another study of computer competencies needed by vocational agriculture teachers, Miller and Foster (1985) asked Iowa and Nebraska vocational agriculture teachers to classify 50 microcomputer competencies. The teachers classified 24 of the 50 competencies as "important."

While these studies have addressed microcomputer usage and the importance of specific microcomputer use skills at the state level, several needs still exist. These include a need to determine how microcomputers are being used in vocational agriculture programs across the United States and a need to determine the current level of use of the microcomputer in vocational agriculture programs in the United States. This study was designed to make these determinations.

## PURPOSE AND OBJECTIVES

The purpose of this study was to determine the competencies deemed most important for practical microcomputer use by secondary vocational agriculture teachers in the United States and to determine the current uses of microcomputers. The objectives were:

1. Determine the extent to which microcomputers are used in secondary vocational agriculture programs in the United States.
2. Determine vocational agriculture teachers' perceptions of the importance of selected microcomputer use competencies in vocational agriculture programs.
3. Determine if differences exist between the demographic characteristics of those teachers who had microcomputers in their vocational agriculture departments and those who did not. The demographic characteristics used in this analysis were years teaching experience, age, number of students in high school, number of student in the vocational agriculture program, and the teacher's opinion of his school board's and principal's support for computer use.

## PROCEDURES

The population (N=12,500) consisted of all secondary vocational agriculture teachers in the United States as listed in the 1984 Agriculture Teacher's Directory (Henry, 1985). Cochran's sample size formula (Snedecor and Cochran, 1980) was used to select a minimum returned sample size of 173. Since this was a national study, a systematic random sample of 312 was used in anticipation of a low response rate. A response rate of 212 (68.4%) was realized after two mailings and a phone follow-up. Analysis of variance was used to determine if differences existed among the demographic characteristics of the three groups of respondents (2 mailouts and 1 phone follow-up). Since no differences were found, it was determined that the respondents were representative of the population and the data were combined.

A questionnaire based on instruments developed by Sutphin et al. (1984) and Hudson (1983) was developed to secure the information needed for the study. The instrument was field tested using 15 vocational agriculture teachers. Changes indicated by the field test were incorporated into the instrument. Instrument reliability was assessed using Cronbach's Alpha and resulted in estimates of $\underline{r} = .86$ for the Likert scale items rated according to the respondent's level of agreement and $\underline{r} = .91$ for the Likert scale items rated according to the importance of selected competencies. Data analysis were conducted with the SPSS-X statistical analysis program (SPSS, Inc., 1983) and included descriptive statistics and inferential $\underline{t}$-tests (Alpha = .01).

## RESULTS

Thirty-nine percent of the respondents indicated that they had computers located in their vocational agriculture department. Forty-nine additional respondents (23%) indicated that they used computers located either in school, at home or some other location such as a college with increased the proportion of teachers using computers to 62%. An average of 1.6 computers per department were reported by those departments with computers. Apple was the main brand of computer reported by the teachers as being in their departments (64.7%) followed by TRS-80 (14.3%) and Atari (9.8%) with a variety of other brands accounting for the remaining 11.2%. Apple and TRS-80 were also the main brands that were available to the respondents at home and in their school. Twenty respondents indicated that they expected to acquire their first or an additional microcomputer for their vocational agriculture department within the coming year.

Hardware and software availability factors were addressed by those respondents who were using computers. The respondents agreed with only one of the seven statements in this area. They gave a rating of 3.95 (agree) to the statement that the types of computers that can do the operation needed are available. The ratings on all other factors fell between 2.5 and 3.5 on the scale which was interpreted as undecided. These data are presented in Table 1.

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Insert Table 1 about here

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Teachers were asked about their use of computer aided instructional practices. As the data in Table 2 indicate, the largest percentage of teachers used the computer for problem solving. This practice was used an average of 8.2 hours per month by over half (78 out of 132) of the teachers who used computers. Other computer aided instructional practices used were educational games (9.9 hours), tutorial presentations (9.2 hours), and simulations (6.7 hours). The latter practices were used by fewer teachers.

Computer aided instructional management practices such as instructional materials preparation, word processing and data base use were employed equally as often by teachers. An average of 64 of the 132 teachers using computers employed these practices for 9.5 hours each month. Average hours of student use was also approximately 9 hours per month, however, fewer students used these practices than did teachers. These data are also presented in Table 2.

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Insert Table 2 about here

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Twenty computer use competencies were rated by respondents as to their importance. Those found to be most important were use of the keyboard, disk drive and printer, all hardware use competencies. Using software to maintain records ranked fourth followed by identification of agricultural and home use software and use of agricultural and home use software. These data are presented in Table 3.

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Insert Table 3 about here

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The data in Table 4 reveals that approximately 40% of the teachers who had used computers could use agricultural software, word processors, and spreadsheets while only 28.7% could use data bases. The percent of teachers who taught the use of these programs and the percent of their students who could use these programs ranged from 2.4 to 29.5%.

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Insert Table 4 about here

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Inferential t-tests were used to determine if significant differences existed between those teachers who had computers in their departments and those who did not. No significant differences existed for the variables age, years of teaching experience, number of students in the school, and number of students in the vocational agriculture department. Significant differences did exist for two variables. Those teachers who had computers perceived that their school board and principal supported the use of computers to a greater extent than those who did not have computers. These data are presented in Table 5.

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Insert Table 5 about here

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## CONCLUSIONS AND/OR RECOMMENDATIONS

1. The percentage of teachers who have computers in their vocational agriculture departments does not appear to be as high as the percentage reported by the National FFA Agricultural Computing Service (1985) which reported that 51% of the programs in the nation had computers. This study found that only 39% of the teachers in the sample had computers. In order for teachers to provide up-to-date programs for their students, state staff personnel should increase their efforts to provide or encourage local school districts to provide computers for vocational agriculture departments.
2. Vocational agriculture departments were more likely to have computers if the principal and school board supported the use of computers. State staffs should take this factor into consideration if

they wish to increase the number of computers used in local vocational agriculture programs.

3. Computers currently in vocational agriculture programs are used more for instructional management (as a tool) than they are for tutorial or direct instructional purposes. Existing research findings on how to effectively incorporate the computer into the instructional environment should be used by teacher educators and state supervisors to aid teachers in using the computer to improve instructional effectiveness. Additional research should be conducted into how the computer can best be used in the instructional (classroom and laboratory) environment in vocational agriculture programs so that teachers can be better prepared to use them for instructional purposes.

4. Since most vocational agriculture departments had Apple (64.7%) and TRS-80 (14.3%) computers, teacher in-service and pre-service training activities should be conducted using one or both of these brands of computers unless evidence exists that this data is not valid for a particular state. This recommendation will remain in effect until these brands are no longer the main computers in use. (It should be noted that the National FFA Agricultural Computing Service has indicated that they will support MS-DOS computers in addition to these two brands).

5. The use of microcomputers in vocational agriculture departments is still in its infancy stage as evidenced by the low number of departments with computers and the low level of usage of the computer for program management and instructional purposes. Kulik, Bangert and Williams (1983) found that high school students who supplement their learning through the use of microcomputers learn more and get better grades on tests and in courses. Due to the urgent need for vocational agriculture programs to be efficient and up to date in both program management and instructional techniques, the National Association of Supervisors of Agricultural Education and the American Association of Teacher Educators in Agriculture should form a joint task force for the purpose of accelerating the introduction and advancement of appropriate computer usage in local vocational agriculture departments.

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Table 1

Computer Hardware and Software Availability for Teachers Using Microcomputers ($\underline{n}$ = 132)

| Availability factor | Mean[a] | S.D. |
|---|---|---|
| Types of computers that can do the operations needed are available | 3.95 | 1.19 |
| Program management software is available | 3.31 | 1.29 |
| Agricultural software is available | 3.29 | 1.23 |
| Software needed for instruction is available | 3.24 | 1.22 |
| Adequate access to computers for needs is available | 3.11 | 1.36 |
| Adequate numbers of computers for needs are available | 3.03 | 1.31 |
| Multiple copies of software needed for instruction are available | 2.88 | 1.30 |

[a] 1 = "strongly disagree", 5 = "strongly agree"

Table 2

Average Monthly Use of Computer-Aided Instruction and Computer-Aided Program Management by Students and Teachers ($n = 132$)

|  | Hours used |  |  |  |  |  |
|---|---|---|---|---|---|---|
|  | By students |  |  | By teachers |  |  |
| Practice | Mean | S.D. | n | Mean | S.D. | n |
| Computer-aided instruction |  |  |  |  |  |  |
| Problem solving | 9.27 | 10.8 | 85 | 8.22 | 10.2 | 78 |
| Tutorial presentation | 9.23 | 11.0 | 70 | 7.51 | 8.8 | 61 |
| Simulations | 6.73 | 2.4 | 51 | 5.15 | 5.5 | 46 |
| Educational games | 9.88 | 17.1 | 50 | 7.33 | 15.5 | 27 |
| Communicating with other computers | 8.46 | 8.5 | 11 | 10.07 | 15.1 | 15 |
| Other uses | 11.3 | 5.2 | 3 | 9.38 | 12.9 | 8 |
| Computer-aided management |  |  |  |  |  |  |
| Instructional materials preparation | 9.34 | 9.5 | 41 | 10.03 | 11.3 | 66 |
| Word processing | 10.29 | 10.0 | 34 | 10.05 | 9.5 | 66 |
| Data base use | 7.80 | 6.40 | 25 | 8.59 | 6.7 | 61 |

*Note*. One month designated as 20 school days

Table 3

Teachers Opinions of Importance of 20 Microcomputer Use Competencies

(n = 128)

| Competency | Mean[a] | S.D. | Rank |
|---|---|---|---|
| General knowledge | | | |
| Use an operator's manual | 3.89 | .98 | 7 |
| Define microcomputer terminology | 3.35 | 1.05 | 13 |
| Identify networking opportunities in the community | 2.92 | 1.01 | 15 |
| Perform maintenance on computers | 2.25 | 1.12 | 20 |
| Hardware use | | | |
| Use the keyboard | 4.22 | .87 | 1 |
| Use the disk drive | 4.16 | .86 | 2 |
| Use the printer | 4.12 | .82 | 3 |
| Demonstrate microcomputer operation | 3.77 | .97 | 8 |
| Communicate with other computers | 3.06 | 1.16 | 14 |
| Use the cassette recorder | 2.74 | 1.26 | 16 |
| Describe the difference among brands and models | 2.72 | .88 | 17 |
| Use the graphics tablet | 2.60 | 1.03 | 19 |

(table continued)

Table 3 (continued)

Teachers Opinions of Importance of 20 Microcomputer Use Competencies

(n = 128)

| Competency | Mean[a] | S.D. | Rank |
|---|---|---|---|
| **Software use** | | | |
| Use software to maintain records | 3.98 | .89 | 4 |
| Use agricultural/home use software | 3.92 | .89 | 5 |
| Identify agricultural/home use software | 3.92 | .96 | 6 |
| Evaluate agricultural/home use software | 3.69 | .98 | 9 |
| Use computer as a word processor | 3.52 | 1.00 | 10 |
| Organize a software library | 3.42 | 1.03 | 11 |
| Identify modifications needed in software | 3.38 | 1.08 | 12 |
| Write a program using BASIC or other language | 2.69 | 1.25 | 18 |

[a] 1 = "no importance", 5 = "essential"

Table 4

Computer Program Use by Vocational Agriculture Teachers Who Use Microcomputers ($\underline{n}$ = 132)

| Program type | Percent of teachers who can use program[a] | Percent of teachers who teach program use[a] | Mean percent of students who can use program[b] |
|---|---|---|---|
| Agricultural software | 42.6 | 29.5 | 18.3 |
| Spreadsheets | 41.1 | 19.0 | 9.0 |
| Word processing | 40.2 | 12.9 | 6.9 |
| BASIC for programming | 30.6 | 14.3 | 8.3 |
| Data base management | 28.7 | 6.7 | 2.4 |

[a] Teachers were asked to check all items that they used or taught the use of [b] Teachers were asked to indicate the percent of their students who could use each program listed

Table 5

T-tests of Demographic Characteristics by Whether Respondents had a Computer in the Vocational Agriculture Department

| | Teachers with computers | | | Teachers without computers | | | |
|---|---|---|---|---|---|---|---|
| Variable | Mean | S.D. | n | Mean | S.D. | n | t |
| Years vo-ag teaching experience | 12.3 | 8.0 | 78 | 12.4 | 9.2 | 126 | 0.07 |
| Teacher's age | 37.8 | 9.7 | 83 | 38.7 | 11.5 | 126 | 0.55 |
| No. of students in high school | 661.9 | 607.8 | 81 | 644.6 | 590.3 | 123 | 0.20 |
| No. of students in vo-ag program | 85.0 | 53.6 | 81 | 85.4 | 67.3 | 126 | 0.05 |
| Your school board supports the use of computers[a] | 4.2 | .79 | 82 | 3.7 | .92 | 125 | 3.93* |
| Your principal supports the use of computers[a] | 4.3 | .76 | 82 | 3.8 | .91 | 125 | 3.73* |

[a] Teachers responded to this item on a 5 point Likert type scale with 1 = "strongly disagree" and 5 = "strongly agree"

***$p < .001$

# Hearing Loss Among Teachers of Agricultural Mechanics

Paper Presented at the
Southern Agricultural Education Research Meeting

By: Stanley R. Burke
**Agricultural Education Program Area**
**Virginia Polytechnic Institute & State University**
**Blacksburg, Virginia**
**March 22-23, 1987**

# HEARING LOSS AMONG TEACHERS OF AGRICULTURAL MECHANICS

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## INTRODUCTION

The presence of machine noise levels in vocational laboratories which exceed the safety limits established by the Occupational Safety and Health Administration (OSHA) have been well documented (Plakke, 1985; Miller, G.M. & Shinn, G.C., 1986; Woodford, C., & O'Farrell, 1983; Bear, F.,1969 and Wall, R.A., & Jessee, C.R., 1971). Laboratories which teach agricultural mechanics, general shop, woodworking, metal working, welding and power mechanics are most suspect to having unsafe noise levels generated by their educational activities (Plakke, 1985). O'Neal (1986) noted that high frequency sounds are most likely to cause hearing damage and that sounds produced by most power wood working equipment was in the mid to high frequency range. O'Neal (1986) further noted that equipment operating at high revolutions per minute, such as routers and radial arm saws, will produce very high frequency sounds.

Suter (1984) noted that OSHA hearing regulations were only minimum standards. Suter further acknowledged that fitting and comfort of hearing protection devices have a great deal to do with regular use by workers. Approximately five and one-half million people are estimated to be working in conditions which need hearing protection devices. Burke and Hetzel (personal communication, March 5,1986) found that the planer, radial arm saw, shaper, and dust collecting system in a vocational agriculture laboratory individually and collectively produced harmful noise levels in the hearing zone of the operator.

At the secondary level most hearing and noise studies have focused upon the learning difficulties and hearing losses encountered by students. However, it is known that teachers encounter much longer exposures to loud noises than do their students because of multiple sections of laboratory classes (Roeser, 1980). Burke and Hetzel (personal communication, March 5,1986) found one teacher under the care of a physician who suspected ear problems to be related to loud environmental noise encountered in the school agricultural mechanics laboratory.

The study took place during the agricultural teachers conference during the summer of 1986. The population for the study was the Virginia teachers of vocational agriculture. A stratified random procedure was used in selecting subjects. The sample was stratified by the number of years of teaching experience.

Subjects were contacted prior to the annual teachers conference and asked to participate in the study. Requirements for participation were: 1) submit to a hearing test, and 2) complete a survey describing teacher exposure to noise, laboratory equipment and perceptions of hearing loss.

## Instrumentation

Hearing tests were administered by certified audiologist. The audiologist calibrated all audiometers and supervised the hearing tests. Hearing was tested at 500, 750, 1000, 1500, 2000, 3000, 4000, and 6000 Hertz (Hz) levels. Results for both the left ear and right ear were recorded.

Descriptive information was collected using a researcher prepared instrument. The descriptive instrument was derived from a validated hearing survey form and altered to fit situations specific to Virginia teachers of agriculture. The hearing instrument was subjected to review by a panel of experts and yielded a reliability coefficient of .84.

## Data Collection and Analysis

Hearing tests were made and questionnaires were filled out prior to the opening of the teachers conference. The researcher administered all questionnaires. Individual instructions were related to subjects as they showed up for the hearing test. Because of time, space and budget limitations, subjects had to have hearing tests made and questionnaires completed during the 3 hour registration period immediately prior to the opening of the teacher's conference. Subjects were tested in the order in which they registered for the conference. Seventy five teachers were requested to participate in the study. Because of time limitations only fifty three subjects were tested for hearing loss and 66 subjects completed the questionnaire.

Descriptive statistics were used to summarize and analyze the data. Hearing tests were individually evaluated by a certified audiologist. Occupational Safety and Health Administration (OSHA) tables were used to adjust individual hearing tests for aging.

This study recognizes that some teachers of agriculture do conduct mechanics programs with environmental noise levels which exceed the 85db OSHA standard. Hence this investigation was designed to determine and describe hearing losses which might be occurring among Virginia teachers of agriculture.

## PURPOSE AND OBJECTIVES

The purpose of this study was to determine the extent of and describe the hearing loss among Virginia teachers of agriculture. The study attempted to answer the following questions:

1. Are Virginia teachers of agriculture encountering hearing losses greater than other people of similar age?
2. If hearing loss is occurring among Virginia teachers of agriculture, is it predominately in one ear?
3. If hearing loss is occurring among Virginia teachers of agriculture, how is it dispersed by age?
4. If hearing loss is occurring among Virginia teachers of agriculture, how is it dispersed by years of teaching experience?
5. Do agricultural teachers perceive themselves to be incurring hearing loss because of loud noise emitted from equipment in their laboratories?
6. What laboratory equipment contributes to excessive noise levels in agricultural mechanics laboratories?
7. What out of school activities do agriculture teachers participate in which may contribute to hearing difficulties?

## METHOD AND PROCEDURES

This investigation was conducted as a descriptive expo facto study.

## FINDINGS

The data indicate that of the 53 people tested for hearing loss, 14 subjects were found to have hearing losses greater than others of their age group, refer to Table 1.

Table 1

Measured Hearing Loss Corrected for Aging

| | |
|---|---|
| No. tested for hearing loss | 53 |
| No. found with hearing loss | 14 |
| % with hearing loss | 26.4 |

The data showed that of the 14 teachers incurring hearing loss, five teachers sustained losses in both ears; eight teachers sustained losses in the left ear only and one teacher had loss in the right ear, refer to Table 2.

Table 2

Location of Hearing Loss and Severity

| Location | n | Severity of Loss<br>Mild | Moderate |
|---|---|---|---|
| Left ear | 8 | 7 | 1 |
| Right ear | 1 | 1 | 0 |
| Both ears | 5 | 5 | 0 |

The data in Table 2 further indicates that of those teachers who sustained a hearing loss in the left ear, 7 had mild losses while 1 had a moderate loss. Instructors who had hearing losses in the right ear and those who had losses in both ears were only mild in severity.

A description of hearing losses shown by age and by years of teaching experience is shown in Table 3.

Table 3

Hearing Loss by Age and Teaching Experience

| Years of age | n | Years of teaching | n |
|---|---|---|---|
| 22 - 29 | 0 | 0 - 5 | 0 |
| 30 - 35 | 2 | 6 - 10 | 1 |
| 36 - 40 | 3 | 11 - 15 | 2 |
| 41 - 45 | 3 | 16 - 20 | 4 |
| 46 - 50 | 2 | 21 - 25 | 3 |
| 51 - 55 | 3 | 26 - 30 | 3 |
| 56 - 60 | 0 | 31 - 35 | 1 |
| 61 - 65 | 1 | | |

Teachers from 22 to 29 years of age did not sustain any hearing loss while instructors from 30 to 35 years of age had 2 individuals to sustain a hearing loss. Hearing losses were discovered for 3 teachers in the 36 to 40 year age group and for 3 teachers in the 41 to 45 year age bracket. Two teachers who were 46 to 50 years old had hearing losses while 3 teachers who were 51 to 60 years old had hearing loss. No hearing loss was found in the group 56 to 60 years old and only 1 teacher in the 61 to 65 year group exhibited above normal hearing loss.

Table 3 further shows hearing loss by years of teaching experience. Instructors who had taught 0 to 5 years did not exhibit any hearing loss; however, those who had taught from 6 to 10 years had 1 teacher with a hearing loss. Instructors who taught from 11 to 15 years had only 2 subjects who encountered hearing losses. Individuals who had 16 to 20 years of teaching had 4 teachers with hearing losses, while groups who had from 21 to 25 years and from 26 to 30 years of teaching had 3 subjects in each group to sustain hearing losses. Only 1 teacher in the 31 to 35 years of experience group sustained a hearing loss.

Of the teachers in the study, 54 percent they had hearing losses greater than other people their own age. Seventy six percent of those who felt they had hearing loss, believed it to be caused by loud machine noise present in their agricultural mechanics laboratory. Forty six percent of the teachers did not believe they had a hearing loss problem.

The data indicate that teachers felt power woodworking equipment contributed the most to noise pollution in their laboratories, refer to Table 4. The machines perceived to be the loudest were the planer, radial arm saw, dust collecting system, portable circular saw, table saw, router, and grinder.

Table 4

Perceptions of Equipment Which Produces the Loudest Operating Noise

| Rank order: loudest to quietest | n | M[a] | SD |
|---|---|---|---|
| Planer | 61 | 1.213 | .661 |
| Radial arm saw | 41 | 2.390 | .919 |
| Dust collector | 32 | 3.375 | 1.289 |
| Portable circular saw | 9 | 3.444 | 1.130 |
| Table saw | 33 | 3.485 | .972 |
| Router | 33 | 3.545 | 1.277 |
| Grinder | 11 | 3.545 | 1.293 |
| Portable grinder | 16 | 3.625 | .806 |
| Jointer | 30 | 3.667 | 1.093 |
| Belt sander | 3 | 4.667 | .577 |
| Other | 21 | 3.286 | 1.309 |

[a] M= rank order values totaled and divided n.

Table 5 data reveals that of the 63 teachers responding, 22 teachers indicated they had noisey hobbies while 41 teachers indicated they did not have any noisey hobbies.

Table 5

Participation in Noisey Hobbies

| | |
|---|---|
| Yes | 22 |
| No | 41 |

The data in Table 6 reveals that teachers participate in other activities which may contribute to hearing loss. Some of these activities are hunting, tractor pulling, tractor driving, working with small engines, using chain saws and working in personal woodworking shops.

Table 6

Loud Activities Participated in by Teachers Outside of School

| Noisey hobbies | n |
|---|---|
| Tractor and machinery operation | 7 |
| Hunting and targetshooting | 7 |
| Woodcutting and chainsaws | 4 |
| Woodworking | 3 |
| Truckpulling | 2 |
| Small engine and lawnmowers operation | 2 |
| Honey bee care | 1 |
| Sheepshearing | 1 |

Note. Some teachers listed multiple noisey hobbies.

## CONCLUSIONS

Based on the findings of this study the following conclusions were made:

1. Some teachers of agriculture in Virginia are experiencing hearing losses greater than other people of similar age.

2. Hearing losses which occur among Virginia agricultural teachers are found predominately in the left ear, however some individuals have hearing losses in both ears. Few individuals have hearing loss exclusively in the right ear.

3. Most hearing losses show up between 30 to 50 years of age for teachers of agriculture and between 16 and 30 years of teaching experience.

4. Over 50% of Virginia teachers of agriculture believe they are sustaining hearing losses greater than other people of a similar age. Three fourths of those who think they are sustaining a hearing loss, believe it is caused by loud equipment in their mechanics laboratories.

5. Virginia teachers believe the loudest machines in agricultural mechanics laboratories are the planers, radial arm saws, dust collectors, portable circular saws, table saws, routers and grinders.

6. Some teachers participate in other activities which probably contribute to hearing difficulties. Some of these activities are tractor operation, hunting, tractor pulling, personal woodworking activities, chain saw operation and small engine work.

## Discussion and Recommendations

Further study needs to be made of noise in agricultural mechanics laboratories to determine the long term effects on students and teachers, and to more accurately access the noise conditions under which individuals must study and work. Hearing losses among teachers should be monitored on a regular basis to better document thresholds shifts. School audiologist should be used to monitor threshold shifts in hearing among teachers of vocational programs with high machine noise levels.

Given the fact that many agricultural mechanics programs have noise levels which exceed the OSHA limit, greater emphasis should be given to developing and implementing hearing conservation programs for secondary programs of agricultural mechanics. Hearing conservation efforts should be equal in emphasis and practice to eye conservation programs.

Teachers educators should be aware of the hearing difficulties being encountered by practicing teachers and incorporate more preventive hearing conservation measures into preservice and inservice activities. State Departments of Education, local school systems and teachers should be encouraged to purchase equipment which has been engineered for low noise emission.

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# CHARACTERISTICS AND ATTITUDES ASSOCIATED WITH THE USE OF MICROCOMPUTERS BY NORTH CAROLINA VOCATIONAL AGRICULTURE TEACHERS

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## INTRODUCTION

Managing the increased use of microcomputers at all educational levels continues to be one of the greatest challenges facing educators of the 1980s. U.S. News and World Report (in Malpiedi, Papritan, & Lichtensteiger, 1985) estimated that educators and students in 86% of all U.S. schools now have access to microcomputers. Seventy-five percent of the students and teachers studied by Marshall and Bannon (1985) agreed that people will not be able to escape the influence of computers on their lives.

Simply having microcomputers in the schools serves few purposes unless students and teachers are prepared to use them. Authors (Becker, 1984; Zahniser, Long, and Nasman, 1983; Willis, Johnson, and Dixon, 1983) agree that the uses for computers in education include the following: computer assisted instruction (CAI), computer managed instruction (CMI), computer literacy, and occupational applications - word processing, data base management, and word processing. Vocational educators tend to support the importance of students and teachers learning to use occupational application software and curriculum related software used as computer assisted instruction software. New York vocational educators indicated that occupational application software was used most frequently and while teachers agreed that the ability to use CAI was important, in practice, CAI was seldom to never used (Sutphin, 1984). Malpiedi, Papritan, and Lichtensteiger (1985) discovered that Ohio teachers used commercial farm manangement programs most frequently for instruction and Henderson (1985) concurred that Illinois teachers were using agriculture related software programs more than other applications.

Beyond the status of microcomputer use and desired competencies, few studies have investigated the barriers to using computers in terms of the user's attitude toward computers. Henderson (1985); Malpiedi, Papritan, and Lichtensteiger (1985); and Foster and Miller (1985) indicated that barriers to computer use included expensive software, access to computers, lack of computer teaching materials, and lack of computer knowledge. Wiggins and Trede (1985) studied the influence of student characteristics on achievement in a computer programming class. They concluded that mathematic ability was one of the prime indicators of computer achievement. While microcomputer ownership, formal computer instruction, and programmable calculator experience did not significantly influence student achievement, prior computer experiences tended to influence student attitudes toward computers which in turn influenced student achievement. While numerous barriers have been identified, all have the potential for impeding the use of microcomputers and also serve as blocks toward developing a positive attitude toward computers .

Teachers and students generally have a positive attitude toward using computers (Jay, 1981 and Marshall & Bannon, 1985). However, Norris and Lumsden (1984) quickly pointed out that educators seem to be positive about computers as long as the function of computers was removed from their classrooms. Komoski (1984) and Montag, Simonson, and Maurer (1984) contended that computer anxiety was a viable barrier to the use of computers by students, teachers, and administrators. Individuals who experience cyberphobia, the fear of interaction with computers, rarely enrolled in computer courses (Cowlishaw, 1986). However, enrollment in university computer classes was significantly increased after Cowlishaw conducted short courses for those who exhibited high levels of computer anxiety. Wiggins and Trede (1985) concluded that students who were self-motivated to enroll in their computer class had a more positive attitude and performed better than those who were not self-motivated.

## NEED FOR THE STUDY

The National FFA computer study revealed that only 5% of the vocational agriculture departments in North Carolina were using microcomputers in 1984. Over the past three years, the number of microcomputers in the schools has increased. The North Carolina State Department of Public Instruction has identified required computer competencies for all educators and competencies for educators related to their content areas. However, during the same three year period, only one on-campus university computer course and three state-sponsored workshops have been offered for vocational agriculture teachers. No formal plan for computer education has been developed. There is a lack of evidence as to which teachers are using microcomputers, how they are using them, and what barriers - particularly attitudinal barriers - still impede the adoption of microcompters by the teachers. Before systematic microcomputer instruction can be conducted in the state, this study is needed to address these concerns.

## PURPOSE AND OBJECTIVES

The purpose of this study was to determine the degree of microcomputer use and the computer attitudes of North Carolina vocational agriculture teachers. A secondary purpose of the study was to explore possible relationships between respondent characteristics and computer anxiety levels, a measure of computer attitude.

Research questions answered by the study were as follows:

1. How much computer educational training and experience did the respondents possess and what were the relationships of prior education with computer use?

2. To what degree were teachers using microcomputers, particularly as a tool for teaching, for class preparations, and for other school and personal related work ?

3. What computer anxiety levels were exhibited by the teachers and how did the mean level compare to national norm?

4. What charateristics were associated with computer anxiety levels ?

5. What were the computer educational needs of the respondents ?

## METHODS AND PROCEDURES

The study was of the descriptive research type. Descriptive research studies are designed to obtain information concerning current status of phenomena (Ary, Jacobs and Razavieh, 1985). This was a survey study with the major purpose of describing selected characteristics and exploring possible relationships by employing correlational techniques (Isaac & Michael, 1983).

### The Sample

A population of 372 teachers was identified from the 1985 - 1986 North Carolina Directory of Vocational Agriculture Teachers. Revisions including teacher retirements and position changes as noted by the State Department of Public Instruction were used in determining the accurate number of current teachers as of August 1, 1986. Sample size was calculated from the Krejcie and Morgan (1970) formula so that the sample proportion $p$ would be within $\pm .05$ of the population proportion $P$ with a 95% level of confidence. A sample size of 189 teachers was required for the study. Each member of the population was assigned a three digit number. Using a table of random numbers and a random start, the 189 participants for the study were drawn.

### Instrumentation

The survey used in this study consisted of three parts. The first part elicited demographic, academic, and computer training information from the respondents. The North Carolina State University Agricultural Education faculty reviewed part I to establish the content validity of the instrument. Revisions to improve readability were made. A five point Likert-type scale was adopted from instrumentation validated by Herring to measure degree of computer use. Points of the scale were defined as: 1 = very rarely, 0 > 1 hrs/day; 2 = rarely, 1-2 hrs/day; 3 = some, 3-4 hrs/day; 4 = often, 5 - 6 hrs/day; 5 = very often, 7 + hrs/day.

The third part of the survey was the Computer Opinion Survey (Maurer and Simonson, 1984) used to measure computer anxiety levels by obtaining a computer anxiety index (CAIN) score. The instrument consisted of 26 computer attitude statements, such as "Computers are too complicated to be of much use to me", to which respondents indicated their agreement, 1 = strongly agree to 6 = strongly disagree. A raw score from 26 to 156 was divided by 26 to obtain the CAIN score. The lower the score, the lower computer anxiety and more positive the attitude. Reliabilty estimates were as follows: the test/retest coefficient of stability was .90 and the Cronbach's coefficient alpha measuring internal consistency was .96.

### Administration

The surveys were administered by the researchers in August at the1986 North Carolina Vocational Education Workshop. Surveys were mailed to those teachers included in the sample who did not complete a survey at the workshop. Two follow-up mailings of the surveys were done at two week intervals. Miller and Smith (1983) discussed several techniques for handling non-response error, one of which was comparing early and late respondents. Since research has shown that late respondents are similar to non-respondents, one way to estimate the nature of replies of non-respondents is through late respondents. Third round respondents were treated as late respondents. No statistical differences were found on selected variables between conference participants (early respondents) and late respondents. The technique was also chosen in order to dispell any suspicion that there were differences between those who did and did not attend conference. Finding no differences, the researchers were justified in generalizing from the respondents to the sample. One hundred sixty-three teachers returned completed surveys for an 86% return rate.

### Data Analyses

The StatView microcomputer program (Feldman & Gangnon, 1985) was used for the data analysis. Measures of central tendency, distribution, frequencies and/or percentages were reported to describe demographic, academic, computer educational training, amount of computer use, and professional characteristics. Correlation coefficients appropriate to the data level were used to explore the relationships between the respondents' characteristics as well as degree of computer use and the respondents' CAIN scores. In order to explore relationships between nominal data and CAIN scores, the scores were grouped as high (greater than one standard deviation above the mean), moderate, and low (greater than one standard deviation below the mean) anxiety scores. Davis Conventions (1971) were used for the interpretation of the strength of the relationships. The conventions used were as follows:

| Coefficient | Description |
|---|---|
| .70 or higher | Very strong association |
| .50 to .69 | Substantial association |
| .30 to .49 | Moderate association |
| .10 to .29 | Low association |
| .01 to .09 | Negligible association |

### Limitations of the Study

Conclusions of the study were limited to those who were identified as vocational agriculture teachers in North Carolina for the 1986 - 1987 school year as of August 1, 1986. The study represented a "slice of time" and what was true for that time period. The researchers can not control local school system activities which might include the sudden infusion of microcomputers and microcomputer instruction locally. Therefore, the results of the study must be regarded as short term. Survey research is also dependent on the honest reporting of the participants and data were interpreted with that assumption in mind.

## FINDINGS

### Demographic, Academic, and Professional Characteristics of the Sample

Ninety-five percent of the respondents were male. The age groups of the respondents included: 21-30 years (26.54%); 31-40 (33.33%); 41-50 (19.14%); 51-60 (19.14%); and over 60 years (1.85%). All respondents held college degrees with 97 bachelor, 63 masters, 2 associate, and 1 six year degrees. College math grades earned by the respondents (A=4 points) were mostly Bs (47.85%), followed by Cs (39.88%) and 12.27% were As.

Most of the teachers were production agriculture teachers (41.72%). Others primarily taught horticulture (29.45%) followed by agriculture mechanics (14.11%), introduction to ag/natural resources (8.60%), forestry (2.45%), natural resources (2.45%), prevocational (.61%), and other (.61%).

## Computer Experience and Education

Only 89 (54.6%) teachers have ever used microcomputers. Of those who used computers, Apple computer was the predominant brand used (35.58%) followed by Radio Shack (14.72%). Eleven percent of the teachers actually owned a microcomputer.

A lack of formal computer course training was evident as 122 or 74.85% of the teachers had never taken a college credit computer course. Thirty teachers or 18.40% completed one semester course, eight (4.91%) completed two semester courses, and three (1.84%) completed 3 semester courses. On the other hand, 109 (66.87%) indicated that they had participated in computer workshps or inservice activities, while fifty-four (33.13%) teachers had not. The mean number of hours spent in workshops/inservice was 9.62 hours with a standard deviation of 12.56, a range equal to 70, and a median of 4. The positvely skewed distribution indicated that while the respondents had computer training, the amount of training for the most part was very limited.

Was there a relationship between computer education and hours of computer use by the respondents ? As shown in Table 1, there was a significant moderate association between the number of computer courses taken and the number of daily hours the respondents use computers. A significant low association was found to exist between the number of workshop/inservice hours completed and the number of daily hours the respondents used computers.

Table 1

*Relationships Between Types of Computer Education and Computer Use*

| Type of Computer Education | Hours of Daily Computer Use |
|---|---|
| Number of university computer courses | .323* |
| Hours of workshop/ inservice computer training | .291* |

Note. Relationships determined by Pearson Product Moment Correlation Coefficient, Pearson r.
*p < .01

## Educational Computer Uses

On the average, teachers used microcomputers .55 hours per day with a standard deviation of 1.31. In terms of specific uses, of those who used computers, 36.20% used them as a teaching tool (CAI); 32.51% for school related and other personal work, applications i.e. correspondence, inventory, budgets, etc.; and 28.22% for preparation of course materials, student grades (CMI).

Respondents perceived that managing student information was the most important use for microcomputers (Table 2). That use was followed by teaching, nonstudent school related work, networks, personal management, and entertainment. When the rankings of those teachers who used computers was compared to the rankings of those who did not use computers, the orderings of the uses were identical.

Table 2

*Rank Ordered Means of Perceived Use for the Microcomputer in Education*

| Ranking | Computer Use | Mean |
|---|---|---|
| 1 | Managing student information (grades, SOE records,etc.) | 2.26 |
| 2 | Teaching students (tutorials, simulations, ed games,etc.) | 2.50 |
| 3 | Nonstudent school related work (letters, reports, mail list, etc.) | 2.81 |
| 4 | Networks (Agri-Data, CompuServe, etc.) | 3.85 |
| 5 | Personal management(budget, taxes, etc) | 4.00 |
| 6 | Entertainment (non ed games) | 5.51 |

Note. Respondents ranked the uses from 1 = most important to 6 = least important.
n = 163

## Computer Attitude and Anxiety Levels

Teachers tended to be more positive toward using computers than negative. Out of a possible 156 points, scores ranged from 26 to 132, with a mean of 64.45, standard deviation of 21.39, median equal to 61.5 and a mode of 39. The converted mean CAIN score for the teachers, obtained by dividing the raw score by 26, was 2.48 with a standard deviation of .82, Md = 2.36, and Mo = 1.5. No statistically significant or practical difference was found between the respondents' mean score, 2.48, and the national norm group mean for teachers, 2.44 ($t = .597$, $df=159$, $p < .375$).

## Relationships Between Selected Characteristics and Computer Anxiety

Statistically significant ($p < .01$) moderate negative associations were found for the relationships between computer anxiety and the following characteristics: daily hours of use, $r = -.361$; degree of computer use as a teaching tool, $r = -.381$; degree of computer use for course preparation, $r = -.367$; degree of computer use for other school and personal use, $r = -.387$. As the degree of computer use increased, anxiety levels decreased. Low significant negative relationships were found between the number of computer college courses taken and anxiety scores ($r = -.192$, $p < .05$) and between the number of workshop/inservice hours and anxiety scores ($r = -.243$, $p < .01$). It follows that as computer education increased, computer anxiety scores decreased.

Age and ones computer anxiety score are not independent ($X^2 = 15.277$, C.V.=12.59, df=6, $p < .05$). A statistically significant ($p < .01$) positive low association existed between age and computer anxiety (Cramer's V = .219). For the respondents in this study, their college math ability was independent of the anxiety score ($X^2 = 7.132$, C.V.= 9.49, df=4,

$p < .05$). A low association between math ability and computer anxiety scores (Cramer's V = .149) was not significant. The area of teaching - production agriculture, horticulture, agricultural mechanics, and others combined - was also independent of the anxiety score ($X^2 = 5.178$, C.V.=12.59, df = 6, $p < .05$). A low association, Cramer's V = .127, was found but not significant.

## Computer Educational Needs

Computer attitudes and educational needs of teachers by districts are displayed in Table 3. Only 42.94% of all responding teachers indicated interest in participating in credit computer courses while 65.64% were interested in computer workshops. State staff members were interested in knowing the frequency and percentage of teachers per vocational education district who desired computer courses and/or computer workshops. The mean computer anxiety level held by teachers in that district provides an indication as to the computer attitudes held by teachers in those areas of the state.

The teacher computer attitudes in North Carolina tend to be more positive in the central part of the state - districts 3,4,5, and 6, than in the western area - districts 7 and 8 or the eastern and southern coastal areas - district 1 and 2. Teachers in district 1 tend to be negative toward using computers although 50% are receptive to courses and 57% to workshops. Teachers in district 7 and 8 had higher mean anxiety levels than other teachers but both had more low scores than high. At least 50% or more of the teachers in districts 3,4, and 8 desired computer courses. The desires for workshops were strongest for districts 2,4,5, and 6.

Table 3

*District Computer Anxiety Levels and the Teachers' Desire for Courses and Workshops*

| | Teachers | | Anxiety Level | | | Desire | | Desire | |
|---|---|---|---|---|---|---|---|---|---|
| District | (n) | Mean | SD | Me | Mo | Course(f) | % | Wkshs (f) | % |
| 1 | 14 | 2.50 | 1.00 | 2.61 | 3.69 | 7 | 50.0 | 7 | 50.0 |
| 2 | 26 | 2.52 | .54 | 2.40 | - | 5 | 19.2 | 22 | 84.6 |
| 3 | 30 | 2.46 | .72 | 2.43 | 2.73 | 16 | 53.3 | 16 | 53.3 |
| 4 | 28 | 2.26 | .68 | 2.19 | - | 16 | 55.2 | 19 | 65.5 |
| 5 | 15 | 2.32 | .84 | 2.11 | 1.50 | 6 | 37.5 | 13 | 81.3 |
| 6 | 15 | 2.39 | .85 | 2.04 | 1.73 | 6 | 40.0 | 11 | 73.3 |
| 7 | 20 | 2.77 | .98 | 2.90 | 2.00 | 8 | 40.0 | 11 | 55.0 |
| 8 | 13 | 2.74 | 1.20 | 2.33 | 1.50 | 6 | 53.8 | 7 | 58.3 |

Note. Total number of respondents, n=161. Percentages do not total 100%; they represent percentages of teachers in each district responding yes to courses and to workshops.

## CONCLUSIONS

Based on the findings of the study, the following conclusions relevant to North Carolina vocational agriculture teachers were warranted:

1. Computer education for North Carolina vocational agriculture teachers has not occurred to a great extent. With additional education, teachers should increase their microcomputer usage.

2. Although there is limited computer use by the teachers, they are on target as to the priority of important uses of the microcomputer as a management and teaching tool.

3. Teachers' attitudes toward computers are generally positive. With increased computer use, the anxiety levels felt by computer users should diminish.

4. As higher anxiety levels are associated with increased age, computer workshop/course instructors need to be sensitive to providing successful experiences for all, especially older students. On the other hand, math ability and teaching area were not associated with computer anxiety levels and should not be viewed as indicators of computer anxiety.

5. Teachers are most likely to participate in computer workshops and secondly, courses.

## RECOMMENDATIONS

1. A systematic computer education plan should be developed and implemented immediately. Since 59.51% of the respondents held bachelor degrees, teachers should be encouraged to earn their master degrees since computer courses satisfy part of the degree requirement.

2. Computer courses and workshops should continue to emphasize using the computer as an instructional and as a management tool in the classroom. However, the use of networks also needs attention so that teachers can better utilize that application.

3. The Computer Opinion Survey should be administered before instruction as it provides a useful indication as to which students need the most help in diminishing negative computer attitude barriers.

4. Further analysis of the data should be done to investigate those characteristics which are the best predictors of computer anxiety.

5. Further research needs to be conducted to determine how various instructional techniques affect computer attitude and learning.

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# ASSESSMENT OF THE MORALE OF BEGINNING VOCATIONAL AGRICULTURE TEACHERS IN ILLINOIS

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## INTRODUCTION

The morale of vocational agriculture teachers has been the subject of several studies in agricultural education during recent years. Miller (1978) found that the morale of beginning vocational agriculture teachers in Virginia was higher than the morale level of experienced teachers. However, Debertin and Priebe (1984) reported that experienced teachers scored higher on the Purdue Teacher Opinionaire, an instrument designed to measure teacher morale, than did beginning vocational agriculture teachers. Grady and Burnett (1985) found that vocational agriculture teachers were "moderately satisfied" with their jobs, and that more experienced teachers reported higher levels of job satisfaction than beginning teachers.

Many vocational agriculture teachers leave the profession within the first five years (Craig, 1983; Knight, 1978), indicating a dissatisfaction with some aspect of teaching. In an effort to assist beginning vocational agriculture teachers with specific problems and concerns, many universities offer "Beginning Teacher Programs" through their agricultural education departments. In addition to assisting beginning vocational agriculture teachers in planning and delivering instruction for their students, the beginning teacher program at the University of Illinois emphasizes developing and using advisory committees, student recruitment activities, and techniques for assisting students in developing supervised occupational experience programs. Little is known concerning the effect of beginning teacher programs on the morale of those who participate in those programs.

## PURPOSES AND OBJECTIVES

The purpose of this study was to assess the level of morale of beginning vocational agriculture teachers in Illinois who enrolled in an organized course for beginning teachers and those who did not enroll in the beginning teachers course.

The specific objectives of this study were stated as research questions, as follows:

1. What was the overall morale level of Illinois beginning vocational agriculture teachers, as measured by the Purdue Teacher Opinionaire (PTO)?

2. Were there differences in the morale levels of beginning vocational agriculture teachers who enrolled in the beginning teachers course, as compared to those who did not enroll in the beginning teachers course?

3. What was the relationship between morale levels of beginning vocational agriculture teachers in Illinois and the following demographic variables:

    a. school size?
    b. vo-ag enrollment?
    c. percentage of students with SOE?
    d. use of advisory committee?
    e. highest degree earned?
    f. length of teaching contract?

The results of this study could provide valuable information concerning the morale of beginning vocational agriculture teachers in Illinois. One of the major outcomes of this study was the identification of factors which lead to low levels of job satisfaction, or morale, for beginning teachers. A secondary outcome of this study was to identify agricultural program-related variables which contribute to improvement of overall teacher morale. A third outcome of this study was the assessment of the impact of the beginning teacher program on the morale of the participants.

The results of this study could be used to identify problem areas to be included in future beginning teachers courses for vocational agriculture teachers. In addition to improvement of beginning teachers courses, the results of this study could have implications for improvement in the preservice program for Illinois agricultural education students.

## PROCEDURES

The research design utilized by this study was descriptive survey. The population for this study consisted of all beginning vocational agriculture teachers in Illinois during the 1983-84 and 1984-85 academic years. For the purpose of this study, beginning teacher refers to teachers with less than two years of teaching experience. The list of beginning vocational agriculture teachers supplied and verified by the State Agricultural Education Consultants for the Illinois

Department of Adult and Vocational and Technical Education served as the frame for the population (N = 76). During this two-year period there were 49 beginning vocational agriculture teachers who enrolled in the beginning teachers course and 27 teachers who did not enroll in the course. Questionnaires were sent to all 76 beginning vocational agriculture teachers.

With survey research five sources of potential error must be controlled: (a) sampling, (b) frame, (c) selection, (d) measurement, and (e) nonresponse. The methodology in this study controlled for potential errors of measurement, frame, and nonresponse. Since this study involved the entire population of beginning vocational agriculture teachers in Illinois, errors associated with sampling and selection were not potential sources of error in this study.

Two instruments were used to collect data for this study. The Purdue Teacher Opinionaire (PTO) was used to measure teacher morale, and a second instrument was developed by the researchers to collect demographic data. The instrument used to collect demographic data was reviewed by members of the agricultural education faculty at the University of Illinois for clarity. The PTO instrument consists of 100 items, comprising 10 factors associated with teacher morale. The Kuder-Richardson 20 coefficient of internal consistency reported for the instrument was .96, and test-retest correlations were reported at .87, indicating a high level of reliability for the instrument. Validity of the PTO instrument was assumed by its developers through acceptance of the instrument by professional educators and consistency in teacher ratings.

Data were collected near the end of the 1984-85 school year. Questionnaires were mailed to the 76 beginning vocational agriculture teachers in April. Teachers who had not responded by the end of April received a follow up mailing and a telephone call urging them to complete the questionnaire. Responses were received from 42 of the teachers who had enrolled in the course (86%) and 20 who did not enroll in the course (74%), for an overall response rate of 82%. According to Miller and Smith (1983), late respondents have been found to be very similar to nonrespondents. Based upon this finding, data from late respondents (those who responded to the second mailing) were statistically compared to data from early respondents. Since t-tests indicated no significant differences between early and late respondents, the data were combined for analysis.

The PTO instruments were scored by the Center for Instructional Services at Purdue University, and mean scores for the 10 factors associated with teacher morale were calculated. Data were further analyzed by means of the Statistical Package for the Social Sciences (SPSS) available through the Computer Services Laboratory at the

University of Illinois. Descriptive statistics such as frequencies, percentages, measures of central tendency, measures of variance, and measures of association (correlation) were used to describe the data. Although data in this study were collected from the entire population, inferential statistics were used to examine the magnitude of the relationships between variables, rather than statistical significance.

## RESULTS AND CONCLUSIONS

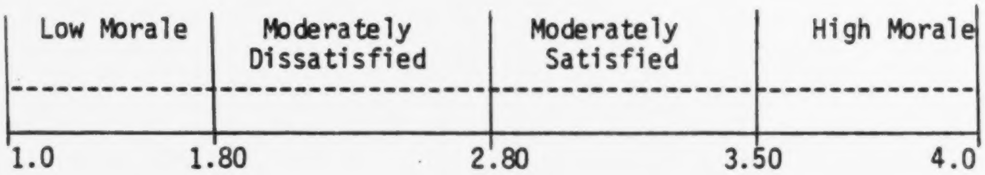
### Findings

### Demographic Characteristics of Illinois Beginning Vo-Ag Teachers

Beginning vocational agriculture teachers in Illinois were teaching in schools with enrollments which ranged from 48 students to 1700 students ($\bar{x} = 355$). Enrollments in vocational agriculture classes ranged from 15 students to 120 students per teacher ($\bar{x} = 53.24$). The teachers reported that on the average almost three-fourths of their students had supervised occupational experience programs. The length of teaching contract ranged from 9 to 12 months, with the greatest number of beginning teachers having 10-month contracts. Only one beginning teacher reported having a 12-month contract. Only eight teachers (13%) had earned a master's degree, with 53 of the teachers holding a bachelor's degree, and one teacher with an associate's degree.

### Levels of Beginning Teacher Morale

Teachers were asked to respond to the 100-item Purdue Teacher Opinionaire by selecting one response from a four-point Likert-type scale, with four representing high morale and one representing low morale associated with each item. The resulting mean morale levels were interpreted according to the following scale:



The overall morale scores, as calculated from the PTO, indicated that the beginning teachers were "moderately satisfied" with their jobs ($\bar{x} = 2.81$). For the 10 factors associated with teacher morale measured by the instrument, the mean scores ranged from 2.38 to 3.28 (see Table 1). Lower morale scores were reported by the beginning teachers for the Teacher Salary ($\bar{x} = 2.38$) and Teacher Load ($\bar{x} = 2.57$) factors. Although high levels of morale were not found for any of the ten morale factors, higher morale scores were reported for Satisfaction with Teaching ($\overline{x} = 3.28$), Rapport Among Teachers ($\overline{x} = 3.04$), and Community Pressure ($\overline{x} = 2.95$).

Table 1

Mean PTO Scores for Beginning Teachers by Morale Factors

| Morale factor | Teachers in program<br>N = 42 | Teachers not in program<br>N = 20 | Combined groups |
|---|---|---|---|
| Rapport with principal | 2.78 | 2.69 | 2.75 |
| Satisfaction with teaching | 3.27 | 3.29 | 3.28 |
| Rapport among teachers | 3.05 | 3.03 | 3.04 |
| Teacher salary | 2.44 | 2.26 | 2.38 |
| Teacher load | 2.51 | 2.71 | 2.57 |
| Curriculum issues | 2.81 | 2.83 | 2.81 |
| Teacher status | 2.69 | 2.43 | 2.60 |
| Community support | 2.91 | 2.87 | 2.90 |
| School facilities | 2.86 | 2.66 | 2.80 |
| Community pressure | 2.89 | 3.08 | 2.95 |
| TOTAL PTO score | 2.82 | 2.78 | 2.81 |

When compared to national norms for junior and senior high school teachers who completed the Purdue Teacher Opinionaire, scores reported by beginning vocational agriculture teachers in Illinois for seven of the ten morale factors were below the 50th percentile. Morale factors for which Illinois beginning teachers compared least favorably with national norms were Teacher Load (below the 5th percentile), Community Pressures (about the 10th percentile), and Rapport with Principal (about the 26th percentile). The morale of teachers in this study was only slightly below the 50th percentile for their Satisfaction with School Facilities and Services. Illinois beginning vocational agriculture teachers scored above the 50th percentile for the morale factor describing their Satisfaction with Teaching.

## Differences in Morale Factors Between Beginning Teacher Groups

Examination of the data indicated that differences in morale between teachers enrolled in the beginning teacher course and those who did not enroll in the course were slight. The greatest differences between the groups were found for the morale factors "Teacher Status," "School Facilities," and "Teacher Load." Vocational agriculture teachers who participated in the beginning teachers course had slightly higher scores for the teacher status factor and the adequacy of school facilities factor than teachers who were not enrolled in the course. However, the opposite was found for the teachers' perceptions of their teaching load, with the teachers enrolled in the beginning teachers course indicating lower levels of morale for this factor than teachers who did not participate in the course. The differences between the beginning teacher groups for both morale factors were not considered large enough to be practically significant.

## Relationships Between Morale and Demographic Variables

There were no significant relationships between teacher morale and five of the six demographic variables examined in this study (see Table 2). Teachers who reported higher percentages of students with supervised occupational experience programs tended to have higher overall morale scores, as measured by the PTO ($r = .43$). This relationship would be considered to be moderate in strength. Teacher morale was only slightly related to length of contract and the frequency of the use of advisory committees. Although the relationship was slight, beginning teachers from smaller schools tended to indicate higher levels of morale.

Table 2

Pearson Correlation of PTO Scores by Demographic Variables

| Demographic Variables | r |
|---|---|
| School size | -.16 |
| Vo-ag enrollment | .15 |
| Percentage of students with SOE | .43* |
| Use of advisory committee | .23 |
| Highest degree earned | .08 |
| Length of teaching contract | .20 |

*$p < .01$.

## Conclusions

Based upon the findings of this study, the following conclusions were drawn:

1. Beginning vocational agriculture teachers in Illinois indicated neither high levels nor low levels of morale. While levels of beginning teacher morale were not as high as would be desired, beginning vocational agriculture teachers in Illinois moderately satisfied with their jobs. The major factors associated with lower levels of morale were salaries received and the teacher load.

2. Participation in a beginning vocational agriculture teachers course did not affect the morale of beginning vocational agriculture teachers. Since beginning teacher programs have many other benefits, the finding that these programs do not significantly affect morale of the participants does not imply that the programs are not meeting many of the needs of beginning vocational agriculture teachers.

3. Student participaton in SOE is associated with the morale of beginning vocational agriculture teachers. Teachers who reported higher percentages of students with SOE programs also reported higher morale scores. Other demographic characteristics such as school size, vo—ag enrollment, use of an advisory committee, highest degree earned, or length of contract were not related to beginning teacher morale.

## Recommendations

1. Since high levels of teacher morale were not reported for any of the ten morale factors, school administrators, state consultants, vocational directors, and teacher educators should focus attention upon improving beginning teacher morale. While financial constraints may limit what can be done in the areas, special emphasis should be placed upon improving teacher morale in the two areas associated with the lowest morale scores, salaries and teacher load.

2. Teacher educators working with beginning vocational agriculture teachers should incorporate activities into the programs to assist the teachers in dealing with those factors which contribute to low teacher morale.

3. Continued emphasis in the preservice and inservice programs in agricultural education should be placed upon developing and implementing supervised occupational experience programs for vocational agriculture students.

4. Future studies should examine a wider range of program related variables in an effort to identify additional variables which contribute to high and low levels of beginning teacher morale.

5. Follow up studies should be conducted to determine whether levels of teacher morale changes with additional years of teaching experience.

6. The morale of beginning vocational agriculture teachers should be compared to morale levels of other beginning teachers to examine differences and similarities in morale across educational program areas.

7. Additional studies should be conducted to examine the effects of beginning teachers courses/programs on participants.

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# JOB SATISFACTION OF NORTH CAROLINA VOCATIONAL AGRICULTURE TEACHERS

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## INTRODUCTION

For a number of years, one of the concerns confronting vocational agricultural education on the national level has been a shortage of qualified teachers. Mattox (1974) expressed this concern when he stated that effective programs of vocational agriculture are dependent upon an adequate supply of qualified teachers. A large percentage of prospective teachers, once trained, enter other professions or leave after teaching a short period of time. (p. 140)

According to Gruenberg (1976), there appears to be a relationship between occupational change or turnover and job satisfaction. When vocational agriculture teachers leave the profession, some degree of job dissatisfaction is implied. Morgan (1978) found that 16% of the beginning vocational agriculture teachers left the profession after one year of teaching experience in Ohio, and only 43% remained in teaching vocational agriculture after six years. In Ohio, from 1970 to 1975, 163 vocational agriculture teachers left the profession for reasons other than death or retirement (Knight, 1978). Hogue, Carnes and Briers (1981) determined that 55% of the vocational agriculture teachers in Texas had 10 or less years of teaching experience, and 33% of the teachers had five or less years of experience. From 1969 to 1974, 124 Nebraska vocational agriculture teachers left the profession (Dillon, 1978). In view of the importance of outstanding and dedicated teachers as a prerequisite for the success of vocational agriculture programs and the apparent relationship between job dissatisfaction and teacher turnover, there appeared to be a need for investigating the factors which contribute to vocational agriculture teacher job satisfaction in North Carolina. It was determined from a review of the North Carolina vocational agriculture teacher directories, that during the years 1980 through 1985, 193 positions had personnel changes. Of these 193 teacher changes, three teachers took early retirements, three teachers died while employed and 64 teachers retired from service. The other 123 teachers left the profession for a change of occupation.

## OBJECTIVES OF THE STUDY

The purpose of this study was to examine selected variables for vocational agriculture teachers in North Carolina, to determine the degree of job satisfaction for those teachers, and to determine whether the selected variables were related to job satisfaction for vocational agriculture teachers in North Carolina. Specifically, the study answered the following questions:

1. What were the intrinsic, extrinsic, and overall job satisfaction levels of North Carolina vocational agriculture teachers?
2. What was the relationship between vocational agriculture teacher job satisfaction in North Carolina and the teachers' levels of satisfaction with the number of different class preparations required each day?

3. What was the relationship between vocational agriculture teacher job satisfaction in North Carolina and the number of years of vocational agriculture teaching experience?
4. What was the relationship between vocational agriculture teacher job satisfaction in North Carolina and the teachers' levels of satisfaction with the type of department, single teacher or multiple teacher in which they were employed?
5. What was the relationship between vocational agriculture teacher job satisfaction in North Carolina and the teachers' perception of each of the following variables?
   a. Degree of administrative support from the principal
   b. Adequacy of the vocational agricultural education facilities
   c. Academic ability of the students enrolled in the program
   d. Discipline of students enrolled in the program
6. What was the relationship between vocational agriculture teacher job satisfaction in North Carolina and the teachers' perception of the adequacy of financial support for each of the following variables?
   a. Salary
   b. Travel reimbursement for the teacher
   c. Local salary supplement for the teacher
   d. Supply of instructional materials for the program
   e. Supply of consumable instructional materials for the program
7. What was the relationship between vocational agriculture teacher job satisfaction in North Carolina and the teachers' perception of the level of community support for the vocational agriculture program?
8. What was the relationship between vocational agriculture teacher job satisfaction in North Carolina and the teachers' perception of the degree of professional acceptance by the following groups?
   a. Other vocational agriculture teachers in North Carolina
   b. Their school faculty
   c. Their school principal
   d. Members of the North Carolina Vocational Agriculture Teachers Association (NCVATA)
9. What was the relationship between vocational agriculture teacher job satisfaction in North Carolina and the teachers' levels of satisfaction with having to perform noninstructional duties?
10. What was the relationship between vocational agriculture teacher job satisfaction in North Carolina and the teachers' levels of satisfaction with having to work long hours and having evening responsibilities?

## METHODS AND PROCEDURES

The study was conducted as a descriptive study although it incorporated aspects of correlational research methodology in that attempts were made to analyze relationships among several variables. The population for this study consisted of the 375 vocational agriculture teachers employed in North Carolina during the 1985-1986 school year as identified in the 1985-1986 North Carolina Vocational Agriculture Teacher Directory.

The sample size was determined by using the formula for studies using Likert type scales, suggested by Hinkle and Oliver (1985). Each teacher listed in the 1985-1986 North Carolina Vocational Agriculture Teacher Directory was assigned a three digit number ranging from 001 to 375 and 320 teachers were randomly selected by utilizing a random numbers table, and these teachers constituted the research sample. An additional 10 teachers selected at random constituted a field test group for the study.

A three part questionnaire was used in the study. The Minnesota Satisfaction Questionnaire (MSQ), short form, was selected as part I of the study questionnaire because it facilitated the determination of an overall job satisfaction score, an intrinsic job satisfaction score, and an extrinsic job satisfaction score. The MSQ (short-form) included 20 items.which represented either an intrinsic or an extrinsic facet of the job situation. Each item presented the respondent with five response alternatives which ranged from not satisfied to extremely satisfied. The general satisfaction scale involved the use of all 20 items with a potential scores ranging from 20 to 100. The intrinsic scoring range involved the use of 12 items with potential scores from 12 to 60. The extrinsic scoring range involved 6 items with potential score ranges from 6 to 30. In scoring the MSQ for general satisfaction, when percentile scores were used, a score of 50 or better indicated satisfaction (Weiss, Dawis, England and Lofquist, 1967). A percentile score of 75 or higher indicated a high degree of satisfaction, a percentile score of 25 represented a low level of satisfaction and percentile scores that ranged from 27 to 74 indicated average satisfaction. For teachers, Weiss, et al. (1967) reported Hoyt reliability coefficients, dependent upon which item, as ranging from .74 to .91 with a general satisfaction Hoyt reliability coefficient of .87. It was reported by the authors that for the intrinsic satisfaction scale, coefficients ranged from .77 to .82 and for the extrinsic satisfaction scale, coefficients ranged from .84 to .91. Regarding the stability of the instrument, the authors reported a test-retest correlation of general satisfaction scale scores which yielded coefficients of .89 over a one-week period and .70 for a one-year interval.

Part II of the questionnaire was a situational questionnaire patterned after the MSQ (short form). Part II was used to gather data which concerned the teachers' perception of 18 independent variables or factors which were examined in the study. The internal consistency of the researcher developed portion was .88, calculated from Cronbach Alpha coefficient.

Part III of the questionnaire used in the study, consisted of a personal questionnaire. Responses to eight items enabled the gathering of demographic information related to the teachers.

Prior to the actual field test of the questionnaire, parts II and III were reviewed by a panel of experts to determine the readability and suitability of the questionnaire. Two hundred and twenty questionnaires were received following the initial mailing which constituted a 68.75% response rate. A second mailing resulted in the obtaining of an additional 40 additional questionnaires. were received which constituted a 40% response rate for the second mailing. The total number of returned, usable questionnaires equalled 260, for a response rate of 81.25%.

In order to determine if there were any differences between the early and late respondent groups, t-tests were computed for the two respondent groups for the intrinsic, extrinsic and overall MSQ scores. Miller and Smith (1983) reported that late respondents were often similar to nonrespondents and if no statistical differences were found, then it is permissable to generalize the findings to describe the sample.At the .05 level, there were no significant differences for overall MSQ, intrinsic MSQ, or extrinsic MSQ scores for the two groups. Since there were no differences between the early and late respondents in the study, data were combined for analysis.

## FINDINGS

Of the 260 respondents, 6.5% were female, 93.5% were male. The racial composition of the respondents was 13.5% non-white and 86.5% white. Of the respondents, 81.1% were enrolled in vocational agriculture while in high school while 18.9% were not. Among the respondents, 81.9% reported that the majority of their vocational agriculture students came from rural backgrounds. The respondents reported that their school student enrollments ranged from a low of 125 students to a high of 2,500 students. The largest percentage of respondents (54.6%) in the sample were employed in multiple teacher departments.

For the overall MSQ score, the potential range of scores is from 20 to 100. The minimum overall MSQ score for respondents was 38 and the maximum score was 97. The mean overall MSQ score for the respondents was 75.86 with a standard deviation of 9.78. For comparative purposes, this mean score approximated the 45th percentile for the "Employed Non-Disabled" group in the Minnesota Satisfaction Questionnaire manual.

The potential range for intrinsic scores is from 12 to 60. For respondents, the minimum score was 18 and the maximum intrinsic score was 60. The mean intrinsic MSQ score for these teachers was 49.08 with a standard deviation of 5.53.

The potential range for extrinsic scores is 6 to 30. For respondents, the minimum extrinsic score was 7 and the maximum extrinsic score was 30. The mean extrinsic MSQ score was 19.23 with a standard deviation of 4.31.

Table 1 presents the mean satisfaction scores for the variables for North Carolina vocational agriculture teachers by rank.

Table 1

Mean Rankings of Satisfaction Levels of Variables for North Carolina Vocational Agriculture Teachers

| Rank | Variable | Mean | SD |
|---|---|---|---|
| 1 | Professional acceptance by other vo-ag teachers | 4.062 | .586 |
| 2 | Professional acceptance by members of NCVATA | 4.046 | .626 |
| 3 | Professional acceptance by school faculty | 3.985 | .663 |
| 4 | Type of teaching department | 3.962 | .860 |
| 5 | Professional acceptance by school principal | 3.888 | .856 |
| 6 | Level of community support | 3.712 | .855 |
| 7 | Number of different class preparations required daily | 3.658 | .939 |
| 8 | Administrative support | 3.646 | 1.093 |
| 9 | Vocational agriculture facilities | 3.446 | 1.150 |
| 10 | Discipline of enrolled students | 3.312 | 1.072 |
| 11 | Long hours and evening responsibilities | 3.262 | .935 |
| 12 | Instructional materials | 2.996 | 1.064 |
| 13 | Consumable instructional materials | 2.942 | 1.156 |
| 14 | Travel reimbursement | 2.915 | 1.215 |
| 15 | Salary | 2.888 | 1.132 |
| 16 | Noninstructional duties | 2.762 | 1.226 |
| 17 | Academic ability of enrolled students | 2.692 | 1.031 |
| 18 | Salary supplement | 2.335 | 1.192 |

Note: Scale is 1= very dissatisfied, 2= dissatisfied, 3= neither, 4= satified, 5= very satisfied.

North Carolina vocational agriculture teachers were satisfied with the following variables: (a) professional acceptance by other vocational agriculture teachers in the State, (b) professional acceptance by members of the NCVATA, (c) professional acceptance by school faculty, (d) type of teaching department, (e) professional acceptance by school principal, (f) community support, (g) number of different class preparations required daily, (h) administrative support by the principal, (i) vocational agriculture facilities, (j) discipline of the enrolled students, and (k) having to work long hours and having evening responsibilities. Significant numbers of vocational agriculture teachers were both satisfied and dissatisfied with the following variables: (a) adequacy of financial support for instructional materials, (b) adequacy of financial support for consumable instructional materials, (c) adequacy of financial support for travel reimbursement for the teacher, and (d) salary.

North Carolina vocational agriculture teachers were dissatisfied with (a) having to perform noninstructional duties, (b) academic ability of the enrolled students, and (c) adequacy of financial support for local salary supplement for the teacher.

Table 2 presents the levels of satisfaction with the number of different class preparations required each day. The largest percentage of teachers by degree of satisfaction with the number of different class preparations required each day was for the satisfied group, 61.5%. Thirty-eight (14.6%) of the respondents either reported that they were very dissatisfied or dissatisfied with the number of different class preparations required each day. There were equal numbers of teachers for this variable, that were either dissatisfied or very satisfied.

Table 2

Frequency and Percentage of North Carolina Vocational Agriculture Teachers' Level of Satisfaction with the Number of Different Class Preparations Required Daily

| Level of satisfaction | f | % |
|---|---|---|
| Very dissatisfied | 9 | 3.5 |
| Dissatisfied | 29 | 11.1 |
| Neither | 33 | 12.7 |
| Satisfied | 160 | 61.5 |
| Very satisfied | 29 | 11.2 |
| Totals | 260 | 100.0 |

Table 3 presents the respondents by years of teaching experience and summarizes levels of job satisfaction for the respondents. The teachers were grouped into catagories which consisted of five year blocks based on the number of years of teaching experience order to better examine the situation in regards to years of teaching experience.

The mean number of years of teaching experience for the teachers in the research sample was 13.64 years with a standard deviation of 9.4 years. Of the teachers in the research sample, 42.4% reported 10 or fewer years of teaching experience. The smallest percentage of teachers based on the

Table 3

Frequency and Percentage of North Carolina Vocational Agriculture Teachers' Years of Teaching Experience and Mean Overall MSQ Scores

| Years of teaching experience | f | % | Overall MSQ |
|---|---|---|---|
| 1 to 5 | 64 | 24.6 | 74.00 |
| 6 to 10 | 51 | 19.6 | 71.92 |
| 11 to 15 | 42 | 16.2 | 76.71 |
| 16 to 20 | 43 | 16.5 | 78.20 |
| 21 to 25 | 24 | 9.2 | 80.21 |
| 26 to 30 | 21 | 8.1 | 73.71 |
| 31 to 35 | 12 | 4.6 | 83.42 |
| 36 to 40 | 3 | 1.2 | 86.67 |
| totals | 260 | 100.0 | |

number of years of teaching experience was for those teachers with 36 to 40 years experience. The teachers that had one to five years of experience constituted the largest percentage of teachers by catagory. The respondents with 6 to 10 years of teaching experience had the lowest mean overall MSQ score. The respondents that had 26 to 30 years of teaching experience had the second lowest mean overall MSQ score. The respondents with 36 to 40 years of experience had the highest mean overall MSQ score. Respondents that had one to five years of teaching experience, 6 to 10 years of teaching experience, and 26 to 30 years of teaching experience had mean overall MSQ scores that were lower than the mean overall MSQ score for all respondents.

Table 4 presents the percentages and frequencies of the respondents by levels of satisfaction with the type of teaching department in which they were employed. Only 25 of the respondents were either very dissatisfied or dissatisfied with the type of teaching department in which they were employed. Nearly 25% of the respondents were very satisfied with the type of teaching department in which they were employed.

Table 4

Frequency and Percentage of North Carolina Vocational Agriculture Teachers' Levels of Satisfaction with the Type of Teaching Department

| Level of satisfaction | f | % |
|---|---|---|
| Very dissatisfied | 2 | 0.8 |
| Dissatisfied | 23 | 8.8 |
| Neither | 20 | 7.7 |
| Satisfied | 153 | 58.9 |
| Very satisfied | 62 | 23.8 |
| Totals | 260 | 100.0 |

As reported in Table 5, the majority of the teachers (66.5%) were either satisfied or very satisfied with the degree of administrative support received from the principal. A small percentage of teachers (5%) were very dissatisfied with the degree of administrative support received from the principal.

Table 5

Frequency and Percentage of North Carolina Vocational Agriculture Teachers' Levels of Satisfaction with the Degree of Administrative Support from the Principal

| Level of satisfaction | f | % |
|---|---|---|
| Very dissatisfied | 13 | 5.0 |
| Dissatisfied | 32 | 12.3 |
| Neither | 42 | 16.2 |
| Satisfied | 119 | 45.8 |
| Very satisfied | 54 | 20.7 |
| totals | 260 | 100.0 |

Table 6 presents the respondents' perceptions of the adequacy of vocational agriculture facilities at the schools where they were employed. The majority of the respondents, 63.1%, were either satisfied or very satisfied with the vocational agricultural education facilties at their schools. However, 28.8%of the respondents were either very dissatisfied or dissatisfied with the vocational agriculture facilities at their schools.

Table 6

Frequency and Percentage of North Carolina Vocational Agriculture Teachers' Levels of Satisfaction with the Vocational Agriculture Facilities

| Level of satisfaction | f | % |
|---|---|---|
| Very dissatisfied | 13 | 5.0 |
| Dissatisfied | 62 | 23.8 |
| Neither | 21 | 8.1 |
| Satisfied | 124 | 47.7 |
| Very satisfied | 40 | 15.4 |
| Totals | 260 | 100.0 |

As reported in Table 7, the majority of the respondents, 53.9%, were either very dissatisfied or dissatisfied with the academic ability of the students that were enrolled in their vocational agriculture programs.

Table 7

Frequency and Percentage of North Carolina Vocational Agriculture Teachers' Levels of Satisfaction with the Academic Ability of Students Enrolled in the Program

| Level of satisfaction | f | % |
|---|---|---|
| Very dissatisfied | 22 | 8.5 |
| Dissatisfied | 118 | 45.4 |
| Neither | 44 | 16.9 |
| Satisfied | 70 | 26.9 |
| Very satisfied | 6 | 2.3 |
| Totals | 260 | 100.0 |

The largest percentage of respondents by level of satisfaction, (45.4%) were those teachers that reported dissatisfaction for the variable. Only 29.2% of the respondents were either satisfied or very satisfied with the academic ability of the students that were enrolled in their vocational agriculture programs.

Table 8 presents the levels of satisfaction for respondents with the discipline of the students enrolled in the programs. Over 50% of the respondents were either satisfied or very satisfied with the discipline of the students enrolled in their vocational agriculture programs. Less than 25% of the respondents were dissatisfied with the discipline of the students enrolled in their vocational agriculture programs.

Table 8

Frequency and Percentage of North Carolina Vocational Agriculture Teachers' Levels of Satisfaction with Discipline of the Students Enrolled in the Program

| Level of satisfaction | f | % |
|---|---|---|
| Very dissatisfied | 12 | 4.6 |
| Dissatisfied | 61 | 23.5 |
| Neither | 45 | 17.3 |
| Satisfied | 118 | 45.5 |
| Very satisfied | 24 | 9.2 |
| Totals | 260 | 100.0 |

The majority of the respondents, 63.1%, were either satisfied or very satisfied with the vocational agricultural education facilties at their schools. However, 28.8% of the respondents were either very dissatisfied or dissatisfied with the vocational agriculture facilities at their schools.

As reported in Table 9, nearly 45% of the respondents reported that they were either very dissatisfied or dissatisfied with the salary received. Approximately 10% of the respondents were very dissatisfied with their salary. Over 36% of the respondents were satisfied with the salary received. Only a small percentage of the respondents (3.9%) were very satisfied with the salary received.

The largest percentage of respondents, 31.9%, were very dissatisfied regarding the adequacy of financial support received as a local salary supplement, and a total of 60.8% were either dissatisfied or very dissatisfied. Only 24.6% were either satisfied or very satisfied with the local salary supplement they received.

Table 9

Frequency and Percentage of North Carolina Vocational Agriculture Teachers' Levels of Satisfaction with the Salary, Local Salary Supplement, and Travel Reimbursement Received

| Factor | Level of satisfaction | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | v dissat | | dissat | | neither | | sat | | v sat | |
| | f | % | f | % | f | % | f | % | f | % |
| Salary | 28 | 10.8 | 88 | 33.8 | 39 | 15.0 | 95 | 36.5 | 10 | 3.9 |
| Local salary supplement | 83 | 31.9 | 75 | 28.9 | 38 | 14.6 | 60 | 23.1 | 4 | 1.5 |
| Travel reimbursement | 37 | 14.2 | 78 | 30.0 | 29 | 11.2 | 102 | 39.2 | 14 | 5.4 |

Note: v dissat= very dissatisfied, dissat= dissatisfied, sat=satisfied, v sat= very satisfied.

Nearly half, (44.2%) of the respondents reported that they were either dissatisfied or very dissatisfied with the adequacy of financial support received for travel reimbursement. However, a large percentage of the respondents, 39.2%, were satisfied with the adequacy of financial support received for travel reimbursment.

Table 10 presents the levels of satisfaction for the adequacy of supplies of instructional materials and consumable instructional materials. A little less than 40% of the respondents reported some degree of dissatisfaction with the adequacy of financial support for instructional materials for the program.

Table 10

Frequency and Percentage of North Carolina Vocational Agriculture Teachers' Levels of Satisfaction with Financial Support for Instructional Materials, and Consumable Instructional Materials

| Factor | Levels of Satisfaction | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | v dis | | dissat | | neither | | sat | | v sat | |
| | f | % | f | % | f | % | f | % | f | % |
| Instructional materials | 21 | 8.1 | 78 | 30.0 | 48 | 18.5 | 107 | 41.1 | 6 | 2.3 |
| Consumable instructional materials | 30 | 11.5 | 80 | 30.8 | 36 | 13.9 | 103 | 39.6 | 11 | 4.2 |

Note: v dis=very dissatisfied, dissat= dissatisfied, sat= satisfied, v sat= very satisfied

The largest percentage of respondents (41.1%), by level of satisfaction was for the satisfied group.Approximately half, 42.3%, of the respondents indicated that they were either very dissatisfied or dissatisfied with the adequacy of financial support received for consumable instructional supplies. Only a slightly larger percentage (43.8%) of the respondents were either satisfied or very satisfied with their situations concerning the adequacy of financial support received for consumable instructional materials.

Table 11 presents the respondents' levels of satisfaction for community support for the program.

Table 11

Frequency and Percentage of North Carolina Vocational Agriculture Teachers' Levels of Satisfaction with Community Support for the Program

| Level of satisfaction | f | % |
|---|---|---|
| Very dissatisfied | 5 | 1.9 |
| Dissatisfied | 21 | 8.1 |
| Neither | 50 | 19.2 |
| Satisfied | 152 | 58.5 |
| Very satisfied | 32 | 12.3 |
| Totals | 260 | 100.0 |

Only 10.0% of the respondents were either very dissatisfied or dissatisfied with the level of community support for their vocational agriculture program. The largest percentage of respondents, by level of satisfaction, was for the satisfied group which was 58.5%. Further, 60.8% of the respondents were either satisfied or very satisfied with the level of community support for their vocational agriculture programs.

Table 12 presents the levels of satisfaction for the teachers' perceptions of the degree of professional acceptance by other vocational agriculture teachers in North Carolina, their school faculty, their school principal, and members of the NVCATA. None of the respondents were very dissatisfied and only 1.9% of the respondents were dissatisfied with their degree of professional acceptance by other vocational agriculture teachers in North Carolina. The largest percentage of respondents, 71.1%, were satisfied with their degree professional acceptance by other vocational agriculture teachers in North Carolina.

Table 12

Frequency and Percentage of North Carolina Vocational Agriculture Teachers' Levels of Satisfaction with Professional Acceptance by Other Vocational Agriculture Teachers in North Carolina, their School Faulty, their School Principal, and Members of the NCVATA

| Factor | Levels of Satisfaction | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | v dis | | dis | | neither | | sat | | v sat | |
| | f | % | f | % | f | % | f | % | f | % |
| Other vo-ag teachers | 0 | 0.0 | 5 | 1.9 | 22 | 8.5 | 185 | 71.1 | 48 | 18.5 |
| School faculty | 2 | 0.8 | 7 | 2.7 | 26 | 10.0 | 183 | 70.4 | 42 | 16.1 |
| School Principal | 7 | 2.7 | 14 | 5.4 | 27 | 10.4 | 165 | 63.5 | 47 | 18.0 |
| NCVATA Mebers | 0 | 0.0 | 3 | 1.2 | 36 | 13.8 | 167 | 64.2 | 54 | 20.8 |

Note: v dis= very dissatisfied, dis= dissatisfied, sat= satisfied, v sat= very satisfied.

There were only nine respondents that reported some degree of dissatisfaction regarding their degree of professional acceptance by their school faculty. The majority of the respondents, 86.5% reported that they were either satisfied or very satisfied with their degree of professional acceptance by their school faculty. Only 8.1% of the respondents indicated dissatisfaction with their degree of professional acceptance by their school school principal. Most of the respondents (91.5%) indicated that they were either satisfied or very satisfied with their professional acceptance by their principal. None of the respondents were very dissatisfied and only three of the respondents were dissatisfied with their degree of professional acceptance by members of the North Carolina Vocational Agriculture Teachers Association. The vast majority of the respondents, 85.0% were either very satisfied or satisfied with the degree of professional acceptance by members of the NCVATA.

Table 13 presents the respondent frequencies and percentages for the levels of satisfaction for having to perform noninstructional duties.

Table 13

Frequency and Percentage of North Carolina Vocational Agriculture Teachers' Levels of Satisfaction with Having to Perform Noninstructional Duties

| Level of satisfaction | f | % |
|---|---|---|
| Very dissatisfied | 50 | 19.2 |
| Dissatisfied | 67 | 25.8 |
| Neither | 54 | 20.8 |
| Satisfied | 71 | 27.3 |
| Very satisfied | 18 | 6.9 |
| Totals | 260 | 100.0 |

As reported in Table 13, 45% of the respondents indicated that they were either very dissatisfied or dissatisfied. However, 34.2% of the respondents indicated they were either satisfied or very satisfied with the noninstructional duties they had to perform.

Table 14 presents the levels of satisfaction for this variable. A little over half, 51.1% of the respondents indicated that they were either satisfied or very satisfied with having to work long hours and having evening responsibilities associated with teaching vocational agriculture. The largest percentage of respondents by level of satisfaction for this variable, reported that they were satisfied. Approximately 23% of the respondents were either very dissatisfied or dissatisfied with having to work long hours and having evening responsibilities.

Table 14

Frequency and Percentage of North Carolina Vocational Agriculture Teachers' Levels of Satisfaction with Having to Work Long Hours and Having Evening Responsibilities

| Level of satisfaction | f | % |
|---|---|---|
| Very dissatisfied | 11 | 4.2 |
| Dissatisfied | 49 | 18.9 |
| Neither | 67 | 25.8 |
| Satisfied | 127 | 48.8 |
| Very satisfied | 6 | 2.3 |
| Totals | 260 | 100.0 |

Table 15 summarizes the findings regarding the relationships between the overall job satisfaction of the respondents as measured by the MSQ (short form) and the teachers' satisfaction

Table 15
Relationships between Study Variables and Overall Job Satisfaction of North Carolina Vocational Agriculture Teachers

| Variable | r |
|---|---|
| Number of different class preparations | .35 |
| Years of teaching experience | .25 |
| Type of teaching department | .44 |
| Salary | .46 |
| Administrative support | .64 |
| Vocational agriculture facilities | .39 |
| Academic ability of enrolled students | .43 |
| Discipline of enrolled students | .43 |
| Travel reimbursement | .22 |
| Local salary supplement | .27 |
| Instructional materials | .35 |
| Consumable instructional materials | .28 |
| Community support | .48 |
| Professional acceptance by | |
| other vo-ag teachers in N. C. | .31 |
| the school faculty | .44 |
| the school principal | .63 |
| members of the NCVATA | .31 |
| Noninstructional duties | .44 |
| Long hours and evening responsibilities | .43 |

Note: Correlations are reported as Pearson r Correlations, all were significant at the .01 level.

with the independent variables for the study. From a practical standpoint, it was determined that there was little if any practical correlation between four of the variables and overall job satisfaction for vocational agriculture teachers in North Carolina. A low practical correlation was determinined to exist between 12 of the factors and overall job satisfaction for the vocational agriculture teachers in North Carolina. A moderate practical correlation was determined to exist between two of the factors and overall job satisfaction for the respondents.

## CONCLUSIONS

The analysis of data in the study supported the following conclusions regarding job satisfaction for vocational agriculture teachers in North Carolina and the various factors which were studied:

1. Vocational agriculture teachers in North Carolina have a moderate level of overall job satisfaction, and higher levels of intrinsic than extrinsic job satisfaction.
2. North Carolina vocational agriculture teachers employed during 1985-1986 were satisfied with the number of different class preparations required each day. Although there was a positive relationship between satisfation with the number of different class preparations required each day and overall job satisfaction, the relationship was considered was low.
3. Job satisfaction for North Carolina vocational agriculture teachers tended to increase with the number of years of teaching experience. However, respondents with 5 to 10 years and 26 to 30 years of experience opposed this trend and were less satisfied with their jobs than were teachers having fewer years of experience.

4. Overall, 81% of the teachers were satisfied to some degree with their teaching department structure. It follows that North Carolina vocational agriculture teachers employed during 1985-1986 were as satisfied teaching in single teacher departments as they were teaching in multiple teacher departments.
5. Administrative support is an important factor with regard to North Carolina vocational agriculture teacher job satisfaction as there was a moderate relationship between satisfaction with the degree of administrative support and overall job satisfaction.
6. Although 63% of North Carolina vocational agriculture teachers employed during 1985-1986 were satisfied with the vocational agriculture facilities, the relationship was considered to be low.
7. North Carolina vocational agriculture teachers employed during 1985-1986 were clearly dissatisfied with the academic ability of the enrolled students as on the average, this factor ranked 17th out of 18 variables.
8. North Carolina vocational agriculture teachers employed during 1985-1986 were mostly satisfied with the discipline of the students enrolled in the program although a substantial percentage, 28%, are dissatisfied thus indicating some concern with discipline as a factor related to job satisfaction.
9. North Carolina vocational agriculture teachers employed during 1985-1986 were both satisfied and dissatisfied with salary. However, the mean level of satisfaction with salary ranked 15th out of 18 variables indicating that this is an important factor with regards to overall job satisfaction.
10. Nearly equal numbers of North Carolina vocational agriculture teachers employed during 1985-1986 were satisfied and dissatisfied with travel reimbursement. However, this is an important factor regarding overall job satisfaction due to its ranking 14th out of 18 variables.
11. On the average, North Carolina vocational agriculture teachers employed during 1985-1986 were clearly dissatisfied with the local salary supplement, this factor was ranked last.
12. Nearly equal numbers of North Carolina vocational agriculture teachers employed during 1985-1986 were satisfied and dissatisfied with the supply of instructional materials. Although there was a positive relationship between teacher job satisfaction with instructional materials and overall job satisfaction, the relationship was considered low.
13. Approximately equal numbers of North Carolina vocational agriculture teachers employed during 1985-1986 were satisfied and dissatisfied with the supply of consumable instructional materials for the program. However, this was an important factor due to its ranking 13th out of 18 variables.
14. North Carolina vocational agriculture teachers employed during1985-1986 were clearly satisfied with the level of community support for the program as on the average, this factor ranked 6th out of 18 variables.
15. On the average, vocational agriculture teachers employed during 1985-1986 were clearly satisfied with the degree of professional acceptance by other vocational agriculture teachers in North Carolina, this was the highest ranked factor among the 18 variables.
16. North Carolina vocational agriculture teachers employed during1985-1986 were clearly satisfied with the degree of professional acceptance by their school faculty; however ,the relationship with overall job satisfaction was low.
17. North Carolina vocational agriculture teachers employed during1985-1986 were clearly satisfied with the degree of professional acceptance by their school principal, the relationship with overall job satisfaction was considered to be moderate.
18. Although 85% of the North Carolina vocational agriculture teachers employed during 1985-1986 were clearly satisfied with their degree of professional acceptance by members of the NCVATA, the relationship with overall job satisfaction was low.
19. North Carolina vocational agriculture teachers employed during 1985-1986 were both satisfied and dissatisfied with having to perform noninstructional duties. However, the mean level of satisfactiøn with having to perform noninstructional duties ranked 16th out of 18 variables indicating that this is an important factor with regards to overall job satisfaction.

20. Overall, 51% of the North Carolina vocational agriculture teachers employed during 1985-1986 were satisfied to some degree with having to work long hours and having evening responsibilities. However, the mean level of satisfaction with having to work long hours and having evening responsibilities ranked 11th out of 18 variables indicating that this is an important factor with regards to overall job satisfaction.

## Recommendations

The following recommendations are made in view of the findings and conclusions:

1. The North Carolina vocational agriculture state staff members should encourage teachers to maintain open lines of communication with their principals and keep them informed about the vocational agriculture program in order to maintain and improve the degree of administrative support from the principals for the vocational agriculture programs.
2. The North Carolina vocational agriculture state staff members, when visiting schools or when conducting school program reviews, should evaluate and make recommendations concerning vocational agriculture facilities.
3. The North Carolina vocational agriculture state staff members should encourage vocational agriculture teachers to work closely with school guidance personnel in scheduling students into vocational agriculture programs. Additionally, state staff members should inform vocational agriculture teachers of current curriculum developments targeted at the less academically oriented students.
4. The North Carolina vocational agriculture state staff members should encourage teachers to maintain and increase community involvement and contact with the vocational agriculture programs. Vocational agriculture teachers should be encouraged to involve local program advisory committees and Future Farmers of America Alumni affiliates with their programs.
5. The North Carolina vocational agricuture state staff members should encourage teachers to maintain and increase communications regarding the vocational agriculture program with their school faculty members.
6. The North Carolina vocational agriculture state staff members should encourage teachers to maintain and increase active participation in the North Carolina Vocational Agriculture Teachers Association (NCVATA).
7. The North Carolina vocational agriculture state staff members should continue to recognize model vocational agriculture programs, and encourage teachers to conduct a total program. Additionally, state staff should continue to minimize unnecessary paperwork for the teachers.
8. North Carolina agricultural teacher educators, during preservice training of prospective teachers, should stress student recruiting and the variety of teaching methodologies available for the less academically oriented student.
9. North Carolina agricultural teacher educators, during preservice training of prospective teachers, should stress the importance of community based vocational agriculture programs and the various schemes for involving the community in the vocational agriculture program.
10. North Carolina agricultural teacher educators, during preservice training of prospective teachers, should stress the importance of professionalism with their students.
11. North Carolina agricultural teacher educators, during perservice training of prospective teachers, should stress the importance of there being a total vocational agriculture program.
12. Local school administrators should be involved in vocational agriculture program planning and should consider the number of different class preparations required daily for the program.
13. Local school administrators should continue to maintain and improve their levels of support for their vocational agriculture programs.
14. Local school administrators should continue and increase their support and interest in the vocational agriculture facilities.
15. Local school administrators should continue to support and maintain appropriate levels of student discipline in the vocational agriculture programs.

16. Local school administrators should consider maintaining and improving travel reimbursement for vocational agriculture teachers at appropriate programmatic levels.
17. Local school administrators should inform appropriate individuals as to teacher dissatisfaction with local salary supplements and encourage appropriate consideration be given these situations.
18. Local school administrators should consider appropriate funding of vocational agriculture programs in regards to instructional materials and consumable instructional materials.
19. Local school administrators should continue to encourage teacher involvement in professional improvement activities.
20. Local school administrators should attempt to minimize the assigning of noninstructional duties to vocational agriculture teachers.
21. Members and leaders of the NCVATA should continue to work with appropriate individuals concerning salary.
22. Members and leaders of the NCVATA should continue to promote the organization. The cooperating teacher program should be continued and expanded for beginning vocational agriculture teachers.
23. A study needs to be conducted to determine the specific causes that influence North Carolina vocational agriculture teachers to leave the profession.

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# MINUTES OF BUSINESS MEETING
March 24, 1986

## Southern Region Research Conference in Agricultural Education

Presiding, John A. Rolloff
Acting Secretary, Max McGhee

The thirty-fifth annual business meeting was called to order by John Rolloff, who asked for corrections or additions to the minutes of the 1985 business meeting as distributed by John Crunkilton. There being no corrections or additions to the minutes they were approved as distributed.

Unfinished business was the announcement and presentation of a plaque for the outstanding research paper presented at this year's conference. The winning paper was entitled, Image of Agricultural Education Teacher Training Programs in Colleges of Education and Agriculture at Three Major Universities. The paper's authors will each receive a certificate. They are:

John R. Crunkilton, Virginia Polytechnic Institute and State University.
Larry E. Miller, The Ohio State University
Jasper S. Lee, Mississippi State University

New business constituted the election of a conference secretary to fill the slate of elected officers for the 1987 Research Conference in Agricultural Education. The new officers are:

| | |
|---|---|
| President: | Martin McMillion, Virginia |
| Vice President: | Larry Arrington, Florida |
| Secretary: | Walter Taylor, Mississippi |

Martin McMillion, Conference President, announced that the 1987 conference will be held in Williamsburg, Virginia, March 21-23 at the Fort McGruder Inn.

The meeting was adjourned.

Respectfully submitted,

Max McGhee
Acting Secretary

# CAREER DECISION PATTERNS OF SENIORS WHO HAVE TAKEN VOCATIONAL AGRICULTURE

Joe W. Kotrlik
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Presented to:
Southern Region Agricultural Education Research Conference

## INTRODUCTION

One observation can be made about teachers of vocational agriculture when career guidance is discussed: career guidance has always been considered a part of their job. They have often performed more of a guidance functions than they have been aware of. Several studies during the 1960's and 1970's (such as Eaddy, 1968), found that vocational agriculture teachers are often more effective than the school counselor in the area of career guidance.

Relatively little attention has been paid to career development in vocational agriculture in recent years. In an Ohio study in 1984, McCracken, Barrick and Beard studied the relationship of farm background to the educational and occupational plans of vocational agriculture students. They found that "there were no differences by sex in their occupational goals, reasons for their decisions to enroll, or their plans following graduation" (p. 56). One implication from their study indicated that "Because the majority (57.3%) of the students plan additional education beyond secondary school, the high school curriculum should serve to prepare students for further education as well as to immediately enter an occupation" (p. 56).

Arrington (1985) found that 73.4% of Florida's senior vocational agriculture students perceived (either agreed or strongly agreed) that their experiences in vocational agriculture helped them to choose an occupation. When asked about their vocational agriculture teacher's assistance in career selection, 88.4% agreed that their vocational agriculture teacher encouraged them to enter an occupation in agriculture, 77.3% agreed that their teacher encouraged them to consider attending college, 73.7% agreed that their teacher provided information on careers outside of agriculture, and 96.8% agreed that their teacher provided information on agricultural careers.

Findlay and Rawls (1984) studied the factors that influenced the agricultural career objectives of students attending historically black four-year institutions. The students indicated that their immediate family influenced them most in pursuing their agricultural career objectives on all 24 guidance services studied.

Eaddy (1968) found that the persons with the most influence on the career choices of vocational agriculture students were ranked as follows:

parents, friends, relatives other than parents, school personnel, and clergymen. He also found that student occupational choices were based primarily upon personal interests, satisfaction and rewards and that high school academic achievement records were related to student career choice levels.

This study was designed to determine the individuals who influence vocational agriculture students' career decisions and the factors that these students take into consideration in making career decisions. What parents, teachers and guidance counselors encouraged students to do after high school was explored. In addition, the differences in responses between vocational agriculture, other vocational, and non-vocational students were addressed. This information should be of value in planning the vocational agriculture curriculum and in career related areas of the instructional program.

## PURPOSE AND OBJECTIVES

The purpose of this study was to determine the individuals and factors that have influenced the career decisions of vocational agriculture students and to determine if vocational agriculture students' responses differ from those of other vocational and non-vocational students. The objectives were:

1. Determine which persons have influenced the career decisions of Louisiana high school seniors who have taken at least one semester of vocational agriculture.
2. Determine the factors that have influenced the career decisions of Louisiana high school seniors who have taken at least one semester of vocational agriculture.
3. Determine what parents, teachers and guidance counselors have encouraged Louisiana high school seniors who have taken at least one semester of vocational agriculture to do after leaving high school.
4. Determine if the responses regarding the persons and factors that have influenced the career decisions of Louisiana high school seniors who have taken at least one semester of vocational agriculture are distributed independently of other senior vocational and non-vocational students. (Non-vocational students are those students who reported that they had never taken a vocational course.)
5. Determine if a relationship exists between years in vocational agriculture and whether the vocational agriculture program or the vocational agriculture teacher had an effect on the student' career decisions.

## PROCEDURES

A closed-form questionnaire was developed by the project staff based on a review of the literature. The instrument was examined for content validity by a state supervisor of guidance programs, two professors who teach vocational guidance courses, 12 graduate students in a vocational guidance course, three school principals, and eight school counselors. These individuals indicated that the instrument possessed content validity.

The instrument was field tested with 1205 students in three high schools of varied size, course offerings, geographic location and socioeconomic status. The field test was conducted with a large number of students so that realistic instrument administration procedures could be simulated. The field test revealed that the instrument was a valid and reliable instrument and that only minor revisions were necessary. Reliability estimates were calculated using Cronbach's Alpha. The estimates for the two scales in the instrument were $\underline{r}$ = .87 and .88.

The population consisted of all senior students in Louisiana's public high schools. The sample consisted of all senior students in 43 Louisiana high schools. The sampling procedure used was a cluster sample within a stratified (by 5 school sizes and 3 culturally diverse geographic areas) random sample with replacement (Snedecor & Cochran, 1980). The frame for the study was taken from the Louisiana School Directory 1985-1986 (1985) which is the official listing of educational institutions in Louisiana.

The purpose for using this design was so that identified subgroups (by school size and area of state) within the population would be represented in the sample in the same proportion that they existed in the population. This plan allowed for fairly accurate estimates of each stratum and much more accurate estimates of the overall population. The largest sampling error anticipated in any cell was less than one percent, with the error rates by strata being lower.

A total of 3,853 students who were in attendance on the day of data collection were surveyed from an estimated population of 45,000. The large number of students surveyed was due primarily to the cluster sampling included in the research design and to data collection constraints placed on research conducted by organizations external to the local school systems. The sampling design allowed the researchers to ensure that all data were collected in a manner that insured the integrity of the data.

All data were collected on-site by a project staff member during April, 1986. Packets with pencils, instruments, answer sheets, and instructions for each group monitor or homeroom teacher were distributed by the project staff. The instrument was administered during the homeroom period or during a morning activity period. The instrument took approximately 20-25 minutes to complete.

Descriptive statistics were used to describe the data relative to objectives 1, 2, and 3. The chi-square test of independence was used to determine if the responses to selected questions were distributed independently of whether the student had taken vocational agriculture, had taken other vocational courses, or had not taken vocational courses (objective 4). The Spearman rho correlation coefficient was used to determine if a relationship existed between years in vocational agriculture and whether the vocational agriculture program or teacher had an effect on the student' career decisions (objective 5). The alpha level was preset at .01 because of the large sample size.

## RESULTS

Of the 3,858 students involved in this study, 830 had taken vocational agriculture, 2,776 had taken some other vocational course or courses, and 252 had never taken a vocational course in high school.

## Factors Important in Selecting a Career

The students were asked to indicate if selected factors were important to them in selecting a career by marking either "yes" or "no." The percentages of students who responded "yes" to each factor are presented in Table 1. As the data indicate, the factors that received the most "yes" responses from students who had taken vocational agriculture were "interest in this work", "working conditions", "salary or wages", and "personal satisfaction."

The chi-square test of independence was used to determine if the responses were distributed independently of whether the student had taken vocational agriculture, whether the student had taken other vocational courses, or whether the student was a non-vocational student. Eleven of the analyses resulted in significant chi-square values (Table 1).

Students who had taken vocational agriculture or other vocational courses responded "yes" more often to indicate that the factor was important to them in selecting a career for nine of the eleven factors for which there were significant chi-square values. The two exceptions were "personal satisfaction" and "inheritance of a farm or business."

For the factor "personal satisfaction," 84.7% of vocational agriculture and non-vocational students responded "yes" compared to 88.4% for other vocational students. For the factor "inheritance of a farm or business," 32.4% of vocational agriculture students, 18.8% of other vocational students, and 20.1% of non-vocational students responded "yes."

The largest difference among the range of distributions existed for the factor "insistence of parents or relatives." The data revealed that 45.1% of vocational agriculture students responded "yes" while only 35.9% of other vocational students and 33.1% of non-vocational students responded "yes."

## Persons Affecting Career Decisions

The students were asked to indicate if selected persons influenced their career decisions by marking either "yes" or "no." The persons and the percentage of students who responded "yes" about each person are presented in Table 2. The data indicated that the persons who received the most "yes" responses were the mother, father, friend and person in the occupation.

The chi-square test of independence was used to determine if the responses were distributed independently of whether the student had taken vocational agriculture, whether the student had taken other vocational courses, or whether the student was a non-vocational student. Twelve of the analyses resulted in significant chi-square values (Table 2).

Students who had taken vocational agriculture or other vocational courses responded "yes" more often to indicate that the person affected their career decisions for nine of the twelve persons listed for which their were significant chi-square values. The three exceptions were for military recruiter, coach, and clergy (pastor, priest, rabbi, or other clergy). For these three persons, the non-vocational students responded "yes" more often than did the other vocational students with higher numbers of vocational agriculture students responding "yes" than for the other two groups.

As expected, the largest difference among the range of distributions existed for one individual, the vocational agriculture teacher. The data revealed that 29.3% of vocational agriculture students felt that the vocational agriculture teacher influenced their career decisions while only 5.6% of other vocational students and 5.0% of non-vocational students indicated that the vocational agriculture teacher had an effect. The next highest differences in the ranges occurred for relatives (grandparent, aunt, uncle or other relative), military recruiter, and father.

## Other Results

When asked what selected individuals had encouraged them to do after high school, 66% indicated parents, 81% indicated teachers, and 78% indicated counselors encouraged them to go to college. The remaining responses were in the categories of attend vocational-technical school, work full time, or go to the military.

Students were asked about selected individuals' attitudes towards vocational courses. The responses showed that 88.7% indicated their parents, 81.4% indicated their counselors, and 86.7% indicated the student had a favorable attitude toward vocational education.

When asked who they discussed their course choices with, 79.2% indicated their parents, 58.2% indicated the guidance counselor, and 48.9% indicated their teachers. When asked who they discussed their career goals with, 84.3% indicated their parents, 47.7% indicated their teachers and 38.9% indicated their counselors.

When asked which courses influenced their career decisions, more students indicated math (50.1%) and business (49.9%) than vocational agriculture (45.5%). Fewer numbers of students indicated that the other 13 courses listed had influenced their career decisions.

Spearman's rho was used to determine if a relationship existed between whether a student indicated that the vocational agriculture teacher had affected the students' career decisions and the number of years that the student had been enrolled in vocational agriculture. A significant value of rho = .2669 ($p < .001$) was calculated indicating that a positive relationship existed. Students were more likely to indicate that the vocational agriculture teacher influenced their career decisions as the number of years in vocational agriculture increased.

Spearman's rho was also used to determine if a relationship existed between whether a student indicated that vocational agriculture had affected the students' career decisions and the number of years that the student had been enrolled in vocational agriculture. A significant value of rho = .3838 ($p < .001$) was calculated indicating that a positive relationship existed. Students were more likely to indicate that vocational agriculture influenced their career decisions as the number of years in vocational agriculture increased.

## CONCLUSIONS AND/OR RECOMMENDATIONS

1. For vocational agriculture students as well as other seniors, parents influence these students' career choices more than any other persons, with the mother being more influential than the father. State

staff and teacher educators should encourage vocational agriculture teachers, counselors and other teachers to consider this factor when working with current students and when recruiting prospective students.

2. For vocational agriculture students, the vocational agriculture teacher is about as influential as the counselor with regard to career decisions. Teacher educators and state supervisors should make this fact known to vocational agriculture teachers and teacher educators should take this into consideration when planning recruitment programs. In addition, vocational agriculture teachers should recognize counselors as being equally influential with the vocational agriculture students and more so with all other students in the school. Strong support and cooperative efforts between the vocational agriculture teacher and the guidance counselor are warranted.

3. It appears that too many parents, teachers and counselors may be encouraging students to go to college. Over 65% of the students perceived that they were being encouraged to go to college by parents, teachers and/or counselors. Standardized test statistics, job availability for college graduates and other factors indicate that this percentage may be unrealistic. This information should be shared with principals, counselors and the news media in an attempt to alleviate this situation.

4. Interest in the work, working conditions, salary/wages, and personal satisfaction are the leading factors for seniors in selecting a career. The students' responses to these factors, as well as to the other leading factors, should be given strong consideration by vocational agriculture teachers in planning their curriculum.

5. The differences in responses between vocational agriculture students who had taken at least one semester of vocational agriculture and all other senior students indicate that a uniqueness exists in the career decision making patters of the vocational agriculture students. High school teachers, counselors and administrators should further examine how different students make their career decisions and, if needed, modify the career guidance program accordingly.

6. A moderately positive relationship existed between years in vocational agriculture and whether the vocational agriculture program or the vocational agriculture teacher had an effect on the student' career decisions. Since the vocational agriculture program is a vocational training program, additional research should be conducted to validate this finding and, if this finding is true, state supervisors and teacher educators should immediately undertake efforts to address this issue.

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Table 1.

Factors Affecting the Career Decisions of Seniors (n = 3,858)

| | Percent responding "yes" | | | |
|---|---|---|---|---|
| Factor | Vo-Ag | Voc | Non-Voc | Chi-square |
| Interest in this work | 90.1 | 93.4 | 85.9 | 23.94*** |
| Working conditions | 84.5 | 90.0 | 80.2 | 33.64*** |
| Salary or wages | 84.8 | 87.5 | 82.3 | 7.92 |
| Personal satisfaction | 84.7 | 88.4 | 84.7 | 9.42*** |
| Availability of jobs | 78.8 | 81.2 | 72.8 | 11.45* |
| Work experience | 74.7 | 72.4 | 62.2 | 14.89** |
| Status and reputation of occupation | 71.8 | 75.8 | 66.7 | 13.54* |
| Indoor or outdoor work | 66.3 | 58.2 | 52.4 | 22.86*** |
| Fringe benefits | 66.3 | 69.3 | 64.8 | 4.19 |
| Length of time for training | 64.6 | 61.3 | 57.4 | 5.06 |
| Cost required to prepare for this career | 64.5 | 63.7 | 57.8 | 3.83 |
| Special talents or abilities | 63.4 | 68.2 | 66.5 | 6.60 |
| Financial backing is available | 62.2 | 62.3 | 55.2 | 4.85 |
| Contributions to society | 54.3 | 59.0 | 52.2 | 8.78 |
| Geographical location | 48.8 | 45.6 | 41.4 | 4.83 |
| Friends, parents or relatives working in the occupation | 47.6 | 35.9 | 33.1 | 39.47*** |
| Insistence of parents or relatives | 45.1 | 34.3 | 28.6 | 38.35*** |
| Marriage | 41.1 | 41.6 | 36.0 | 2.89 |
| Inheritance of a farm or business | 32.4 | 18.8 | 20.1 | 68.45*** |
| Family tradition | 32.8 | 21.7 | 20.6 | 44.07*** |

*Note.* Vo-Ag = vocational agriculture students; Voc = vocational students; Non-Voc = non-vocational students.

*p<.01, **p<.001, ***p<.0001

Table 2.

*Persons Affecting the Career Decisions of Seniors* (*n* = 3,858)

| | Percent responding "yes" | | | |
|---|---|---|---|---|
| Person | Vo-Ag | Voc | Non-Voc | Chi-square |
| Mother | 71.2 | 69.3 | 63.9 | 4.46 |
| Father | 66.1 | 57.3 | 55.8 | 20.85*** |
| Friend | 57.2 | 53.7 | 53.9 | 3.04 |
| Person in the occupation | 56.5 | 54.8 | 46.9 | 7.00 |
| Grandparent, aunt, uncle or other relative | 49.6 | 43.7 | 37.2 | 14.53** |
| Brother or sister | 43.0 | 36.4 | 33.5 | 13.34* |
| Other teachers | 36.0 | 37.2 | 38.6 | 0.62 |
| Guidance counselor | 29.9 | 29.1 | 22.8 | 4.75 |
| Vocational agriculture teacher | 29.3 | 5.6 | 5.0 | 375.34*** |
| Military recruiter | 28.3 | 16.5 | 19.9 | 55.40*** |
| Business and office occupations teacher | 22.1 | 27.1 | 12.9 | 28.49*** |
| Coach | 21.5 | 13.1 | 16.5 | 33.63*** |
| Principal | 19.7 | 11.0 | 13.1 | 40.79*** |
| Industrial arts teacher | 19.0 | 11.7 | 8.3 | 34.63*** |
| Pastor, priest, rabbi or other clergy | 17.4 | 11.2 | 12.3 | 21.58*** |
| Home Economics Teacher | 16.0 | 11.2 | 5.4 | 23.58*** |
| Marketing and distributive education teacher | 14.9 | 11.2 | 8.8 | 10.65** |

*Note.* All students did not have the opportunity to know all vocational teachers and some schools did not have all programs. Vo-Ag = vocational agriculture students; Voc = vocational students; Non-Voc = non-vocational students.

*p<.01, **p<001,***p<.0001